

DOCUMENT RESUME

ED 381 613

CE 068 628

TITLE Growing an Innovative Workforce. Forward Looking Education and Training for Forward Looking Business.

INSTITUTION Prospect Centre, Kingston-upon-Thames (England).

SPONS AGENCY Department of Employment, London (England).

REPORT NO ISBN-1-870974-07-7

PUB DATE Nov 91

NOTE 84p.

PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC04 Plus Postage.

DESCRIPTORS *Change Agents; Change Strategies; *Educational Change; Foreign Countries; *Job Training; *Labor Force Development; Postsecondary Education; Program Descriptions; Technical Institutes; *Vocational Education

IDENTIFIERS Great Britain

ABSTRACT

This report describes and presents experiences of a project that acted as a catalyst for accelerating the pace of change in vocational education and training in Britain. The project involved three colleges of further education (CFEs), three occupations, and eight employers in a test of a new learning approach that would anticipate changes in the world of work and respond to the widely expressed needs of businesses. Chapter I describes the need for change and gives an overview of what senior managers, training managers, and further education staff would have to do to achieve outcomes similar to those pursued in the project. Chapter II gives an overview of the key achievements in each of three locations--Nottingham, Solihull, and the Wirral, in each of which there was a cluster of a CFE and one or more companies. Chapter III describes what was learned and how an innovative work force program can best be developed. The chapter highlights the lessons--in the form of "Learning Points"--associated with each characteristic of such programs. Chapter IV offers practical proposals for making the framework known to, and adopted by, forward-looking companies, public services, and colleges. (YLB)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

Growing An Innovative Workforce

**FORWARD LOOKING EDUCATION AND
TRAINING FOR FORWARD LOOKING
BUSINESS**

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

- ☐ This document has been reproduced as received from the person or organization originating it.
- ☐ Minor changes have been made to improve reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY

FC Hayes

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC) "

The
Prospect
centre



Growing An Innovative Workforce

**The Prospect Centre
Gough House
57 Eden Street
Kingston-Upon-Thames
KT1 1BW
Telephone: 081 541 4773**

TABLE OF CONTENTS

FOREWORD	i
INTRODUCTION	ii
CHAPTER I: HELPING TO RUN THE BUSINESS...AN INNOVATIVE LEARNING SYSTEM	1
■ Education and training for the future: a need for change	2
<i>The changing world of work</i>	
<i>The need for a response from vocational education and training</i>	
<i>Towards a new equilibrium</i>	
■ How the 'innovative workforce' project aimed to contribute	5
<i>What we wanted to do</i>	
<i>Where and how to start</i>	
<i>Guiding principles</i>	
■ Learning aims and learning designs	7
■ Roles – who, where, when	9
■ What did they do?	10
<i>The vision</i>	
<i>The learning framework</i>	
<i>The planning stage</i>	
<i>Implementation</i>	
<i>Assessment</i>	
■ What has been achieved?	12
<i>Costs and benefits</i>	
CHAPTER II: SOME IMPRESSIONS... NOTTINGHAM, SOLIHULL, THE WIRRAL	14
■ Developing a robust partnership for the future	16
■ Building a design for accelerating development in further education	18
■ Developing capability for the future	
CHAPTER III: LEARNING LESSONS... WHAT WORKED AND WHAT DID NOT	24
■ Introduction	26
■ Managing the process of joint working between colleges and companies	26
<i>Learning points</i>	
■ Visioning the future	31
<i>Learning points</i>	
<i>Why visioning the future is important</i>	
■ Overarching capabilities	35
<i>Learning points</i>	
<i>Why are overarching capabilities important?</i>	
<i>The clusters' experience</i>	

■ The parameters of a simulated company of mid nineties <i>Why is a simulation of the future so important?</i> <i>The clusters' experience</i>	41
■ Designing and realising learning situations which develop systems thinking and solving problems in systems terms <i>Learning points</i> <i>Why is systems thinking so important?</i> <i>The clusters' experience</i>	45
■ Using IT as a tool for managing situations <i>Learning points</i> <i>Why is it important to use IT as a tool for managing situations?</i> <i>The clusters' experience</i>	46
■ Basing the curriculum on management systems rather than technical/academic subjects <i>Learning points</i> <i>Why is it important</i> <i>The clusters' experience</i>	49
■ Developing and using a multiple assessment format <i>Learning points</i> <i>What is 'multiple assessment' and why is it important?</i> <i>The clusters' experience</i>	55
■ Phasing the development of the 'innovative workforce' programme <i>Learning points</i> <i>Why might phasing be needed?</i> <i>Possible work at different stages</i>	59

CHAPTER IV: HOW LEADERS CAN IMPLEMENT THE 'INNOVATIVE WORKFORCE' FRAMEWORK

■ The background	68
■ Favourable factors in the environment	70
■ Developments in forward looking companies and colleges	71
■ Opinion-forming organisations	71
■ Infrastructure	72
■ How organisations and individuals can contribute <i>Large employers</i> <i>Action with other employers</i> <i>Action by trade unions</i> <i>Colleges of further education</i> <i>The staff college of further education</i> <i>Partnership between education and business</i>	72
■ Summing up	75

ANNEX 1: MEMBERS OF THE STEERING COMMITTEE

ANNEX 2: MEMBERS OF THE PROSPECT CENTRE PROJECT TEAM

FOREWORD

Not so long ago, training in industry was confined to enabling people to carry out instructions correctly and follow procedures accurately. A small group of highly skilled workers or those who were seeking promotion went to college to obtain vocational qualifications. These qualifications were almost entirely technical in content.

Nowadays, companies which have to compete in home and overseas markets need an active and creative workforce to meet continuous and rapidly changing challenges. In these circumstances, it is 'the people factor' which is vital to gaining competitive advantage.

At the same time, a broader curriculum, learner-centred methods and educational technology can bring college programmes much nearer to the real demands of working in industry.

The interests of companies and colleges can therefore become much closer than they could have been in the past. But 'togetherness' is not enough. The different agendas of forward-looking employers and educationalists have to be brought together in a practical form. Joint working needs to become central to the core purposes of both parties and not a marginal expression of goodwill.

This is why we welcomed and supported the project "Growing an Innovative Workforce". We were glad its value and potential has been recognised by the Employment Department which funded it. We hope that the framework which it offers will be widely applied in industry and in further education. Britain has to compete at world class standards in its products and hence in the capability of its people.

T G Melling
Director
The Staff College
and Chairman
Steering Committee

J B Sharpley
Managing Director
Champion Spark Plug Europe

INTRODUCTION

This is the report of a project led by the Prospect Centre from 1989 to 1991 and funded by the Employment Department. It involved three colleges of further education, three occupations and eight different employers. Its purpose was to act as a catalyst for accelerating the pace of change in vocational education and training. Its aim was to test a new learning approach which would anticipate changes in the world of work and respond to the widely expressed needs of businesses.

Figure 1 shows what has been achieved to date.

Figure 2 highlights some of the key benefits which students and their employers are seeing already.

The Purpose of the Report

The purpose of this report is to:

- use the experience of the project to add substance to the growing movement to enhance the benefits of vocational education and training to learners and employers;
- make known more widely the achievements of the participating companies and colleges and the most important features of the project;
- distil the essence of our learning for the benefit of those who share our analysis of what is needed and who are searching for new ways forward in vocational education and training.

Figure 1: EXISTING AND INNOVATIVE WORKFORCE VOCATIONAL EDUCATION AND TRAINING

(A) Existing VET	(B) Innovative Workforce VET
Source of learning aims and objectives ■ Syllabus of award making bodies	■ Company strategies; criteria for business performance ■ Syllabus of award making bodies
Focus of assessment ■ Syllabus of award making bodies ■ Creativity in, and quality of, project reports	■ Contribution to running the business ■ Syllabus of award making bodies
Basic principles of curriculum design ■ Subjects and units complemented by project work or integrative assignments	■ Management systems and/or business strategies ■ Work in a simulated company of the future
The role of simulations ■ Applying subject learning to a simulated task in the business of today	■ Anticipating and experiencing work roles and challenges of the future ■ Contributing positively to developments in the business
In-company project work ■ Gathering information for college assignments ■ Finding out how business works	■ Learning to solve business problems ■ Opportunities for developing overarching capabilities
Roles of employers ■ Recruit trainees, design training programmes and assess work performance ■ Maintain relations with colleges ■ Participate in advisory committees & lead bodies	■ Sharing business objectives and challenges with college staff ■ Joint working with college staff to design, implement and assess programmes ■ Joint assessment of students' performance and development ■ Learning to identify and play new roles ■ Also those listed in (A)
Roles of college staff ■ Implement learning plans and programmes ■ Pastoral function for students ■ Re-design inputs and processes to improve students' motivation to learn ■ Improve examination success rates	■ Understand the implications of business objectives and challenges for learning objectives and designs ■ Joint working with employers to design, implement and assess programmes ■ Joint assessment of students' performance & development ■ Learning to identify and play new roles ■ Also those listed in (A)
Roles of students/trainees ■ Follow instructions and manage situations in relation to the syllabus ■ Follow training programmes established by employers ■ Contribute to college & company life ■ Make creative contributions to assignments ■ Give feed-back on the quality of learning experience and how it could be improved ■ Assess their own and their peers' performance	■ Identify causes for weak student performance and propose curriculum improvements ■ Take the initiative to propose solutions to business problems which are practicable and can be implemented ■ Identify opportunities presented by trends and developments and take the initiative to turn them into business benefits ■ Identify the personal implication of trends and developments in the occupation and in business ■ Also those listed in (A)

Figure 2: SOME BENEFITS OF THE 'GROWING AN INNOVATIVE WORKFORCE' PROJECTS

To students:

- "Management are involving us and listening to us. It's the first time I can remember."
- "I am really finding out what kind of work experience to expect in the future."
- "At the beginning I was worried. It wasn't what I'd expected, because of the way we worked at school. But I've changed my mind. It makes you feel good to know that people expect you to take responsibility."
- "I can go back to my company and talk with senior managers about how we will have to change in the future."
- "I never used to like computers. I guess I was frightened of them. I'm not frightened anymore."
- "This course isn't like the ones my friends are doing... it's more useful and it's never boring."
- "I thought I'd find it hard going. I'd never been brilliant at school, and it's a long time since I was there. But this is so close to my work that I'm really finding it great. And it's preparing me for a new kind of job."
- "I knew I had to get a qualification after I left school. I didn't expect I'd get such a chance to solve real problems for the company."
- "I never thought I'd be teaching my supervisor how to do things."
- "It makes you think a lot about what you should be learning, and how you can do better next time."
- "Do other companies know about this programme? If not, I'll soon tell them at the interview."

To companies:

- "The student's project has resulted in benefits to him, to the department and to the company generally... it was a really good project, and certainly better than our previous experience of a graduate project."
- "The students are definitely more inquiring and more questioning than in previous years. If we could employ them, there are two things you could be sure of. First of all that we would be delighted to do so, but secondly that they would be giving us all a run for our money!"
- "Sometimes people aren't clear about the priorities at work and have to be prodded to do the next thing. This year, students have been ready to come forward and ask what else needs doing once they have finished a particular job."
- "We used the student in a much wider role than we initially thought possible. We found him very adaptable, not at all frightened to experiment, and very good at taking the initiative."
- "The students have been better than anyone in the department on the systems side. They knock spots off everyone else."
- "One of the students had difficulty processing an order on the computerised purchasing system. Neither her supervisor or manager could help, as neither had sufficient understanding of the system. The student phoned a colleague, another student who had previously worked in the department. The two got together during their lunch hour, worked jointly on the problem and successfully resolved it."
- "The ability to tackle and solve problems, seek and record information and, above all, be creative with ideas and actions has blossomed during the first year of the course. It has developed beyond what I would originally have expected from 17-18 year olds and is reflected in the way in which they have tackled and talked about later assignments. ... such a strength is exactly what we are emphasising in the personal development of our managers and which runs as a theme through the Company philosophy of self development and self achievement."
- "Why should this approach just be for these students? Our senior staff would learn from this programme too."
- "We now have a programme that reflects the real work of building services engineers. We must never neglect the basics of engineering skills and understanding. We also have to keep up with the technology, of course. But 90% of the building services engineer's job is about interfacing with colleagues, customers and suppliers, and managing people and situations – without ever taking your eye off the business issues."

CONTENT OF THE REPORT

The views expressed in this report are necessarily those of the authors and not those of the Employment Department. The Department holds the copyright for three years.

The report is in four chapters.

Chapter I describes the need for change and gives an overview of what senior managers, training managers and college staff would have to do if they wished to achieve outcomes similar to those pursued in the project.

Chapter II gives an overview of the key achievements in each of the three clusters.

Chapter III is not a "How To" manual, but it outlines the way the project developed in the three clusters, the issues encountered and the lessons which were learned.

Chapter IV offers practical proposals for managing the way forward for leaders in business and education. The proposals arise from our experience in the project.

Thank You

Our warmest thanks are due to the staffs of the participating colleges and companies for their persistent commitment to the "Growing an Innovative Workforce" initiative. We appreciate their resolution to face endless learning challenges, their creativity and their generosity in allowing us to make their experiences public.

We enjoyed the active supervision, help and support of a powerful Steering Committee (see Annex 1) which steered a sometimes difficult course through troubled waters.

The Prospect Centre

November 1991

Chapter I

HELPING TO RUN THE BUSINESS... AN INNOVATIVE LEARNING SYSTEM



The changing world of work

***"The 1990s look set
to become the decade
when everyone who
works for the
enterprise will be
seen as helping to
run the business"***

Education and training for the future: a need for change

Not so long ago, Mr. George Meaney, President of the United Auto Workers in the USA, could say that workers were expected to "leave their brains in the car park" when they came to work. Turning up on time and carrying out routine tasks correctly were the hallmarks of good job performance.

A sea-change has happened during the past decade. Increasing competition, rising customer expectations, new technologies and employers' strategic ambitions are making new and higher demands on the UK's workforce.

During the 1980s attention was focused on the customer. Increasingly, people at work have been expected to manage situations so that the customer, as well as the employer, benefits. As a result, everyone who works for the enterprise is coming to be seen as a manager of the business.

Those who are looking ahead to the 1990s anticipate further major change. Sir Paul Girolami, chairman of Glaxo, recently summed it up:

"Innovation should become an attitude of mind. It should permeate the whole business—research, products, production, administration, services and marketing. It is no good being effective in one department and not in another."

People who contribute positively to innovation do not only turn up on time and carry out routine tasks. They do not only manage today's situations with today's customers. In addition, they participate in business development initiatives and even lead development projects. The 1990s look set to become the decade when everyone who works for the enterprise will be seen as helping to run the business.

Those who are looking ahead see two further features of the '90s. One is innovation in the use of information technology, to integrate previously separate parts of the business. Integrated business information systems and flexible manufacturing systems are just two examples. Managing within a computer-integrated business asks for more than keyboard skills. It requires an ability to think in systems terms and an understanding of the connections between different parts of the business as a whole.

A second feature of the coming decade, which is also connected with innovation, is employment security – or rather, the lack of it. As organisations pursue innovation in their markets, their products and services and in the ways in which they work, it becomes less likely than ever that people can assume a "job for life".

During the 1980s, this growing recognition led to calls from employers for adaptability and a willingness to retrain. Today, individuals are beginning to expect that their education, training and employment experience will prepare them for this dynamic labour market and not only provide opportunities to acquire new knowledge and skills from time to time.

Figure 3 summarises these significant trends in the nature of work.

Figure 3

HOW WORK IN ORGANISATIONS IS CHANGING		
1970s	1980s	1990s
Focus of the business		
Production	Serving the customer profitably	Speed, quality and profitability of innovation
Technology		
Mechanical	Electronic	Integrated
Structure		
Hierarchy	Customer and product teams	Networks
Degree of employment security with current employer		
High	Medium	Medium to low
Sources of employment security		
Following the rules	Adaptability	Personal positioning in a changing labour market
Who is expected to manage situations with customers?		
Managers	Customer-contact staff	All staff
Who is expected to initiate change?		
Senior managers	AND middle managers/ function managers	AND the qualified workforce
Who is expected to manage projects to implement change?		
Function managers	AND line managers	AND the qualified workforce
Contributions expected of the workforce		
Follow procedures, carry out instructions to experienced worker standards	AND manage situations to quality standards	AND manage creative contributions within a strategic framework

"Today, individuals are beginning to expect that their education, training and employment experience will prepare them for this dynamic labour market"

EXHIBIT

**BESCO: the
simulated company
of the future***

The joint company/college steering group agreed five features of BESCO which will be central to the students' ability to gain experience of "working in the future": the company's operating environment, its markets and services, use of technology, organisational structure and principles. The group sketched in each of these aspects, in the light of its assumptions about the future.

The operating environment

By the mid nineties, the BSE environment will be considerably more turbulent than today's. Social, economic, political, technological and other change factors will make for an operating environment of increasing uncertainty and unpredictability, in which the one constant feature will be change. As an example – students will also consider others – "green" issues will assume great importance. For example, BSE will need to minimise the use of fossil fuels and plan for the control of emissions. BSE companies will have to be more conscious of the contribution of building services to the overall built environment. In contrast to today, such factors will become critical to business survival and success.

Markets and services

BSE companies of the future will need to have a wider scope and to be more flexible in the services they offer and in the customers to whom they offer them. They will need to incorporate a design, construction and maintenance capability with a high managerial profile. BESCO will be prepared to operate in a variety of modes, including traditional contracting, consultancy, project management, design and build, management contracting and "fast track". Greater collaboration with other suppliers in marketing, R&D and in other key areas is anticipated. BESCO will be aiming to become a highly integrated conglomerate supplier (often to conglomerate customers), but will simultaneously act in strong networking arrangements, held together by management contractors.

BESCO will be operating in markets made more competitive by new technologies, the liberalisation of markets (by 1997 the single European market will be well established), a supply-side overcapacity, partly due to the rationalisation of the early 1990s. Under these circumstances, the construction sector's "tradeability level" (i.e. the proportion of imports and exports to sales) will have to move from the bottom place amongst all UK sectors (1% in 1990) to a place nearer the top of the table (motor vehicles 40%). Competition will have become international.

Today's strong association with particular, usually local, clients will also weaken under these influences. BESCO's market horizons will expand in terms of geography, type of service offered and type of customer. BESCO's "new" customers will place more emphasis on high-quality, right-first-time products and services.

Technology

BESCO will have to be infinitely more technologically sophisticated than even the most technologically advanced of today's companies. The steering group expects big leaps forward in technology applications by companies which want to stay in business. Major advances can be expected in the use of expert systems in design and drafting; thermal modelling; in planning/contracting/control; in commissioning; in "back-office" information systems. The most critical change will come with the integration of the systems for the various functions and activities. This integration will offer to the well-managed BSE business new levels of quality, flexibility, speed, productivity and cost control. Today's average BSE company has nothing like this range of systems.

While BESCO will not be able to offer practice in fully integrated technology (much of which does not yet exist), it will be a BSE company which has integrated technical, financial and human resource sub-systems. Since the "adoption lag" between the best and the rest is shortening rapidly, those working in BESCO will need to be prepared for working in a fully systems-integrated company. This kind of operation will have implications for BESCO's organisation structure and organisational principles.

Organisation structure

The steering group found it difficult to be prescriptive about BESCO's organisation structure. However, in the interests of putting down a baseline for the integrative assignment, a minimum statement is needed. BESCO will start with a small core staff, linking up in a variety of networking arrangements with a range of other organisations. The core staff will include five professional staff – surveying, design, contract engineering, estimating and labour supervision – two administrative staff and 20 operatives. The company will operate from purpose "built" (by students) premises outside Basford Hall.

Organisational principles

Again, it is difficult to be prescriptive. However, to compete in international markets, BSE companies in the UK will need to reach benchmarks which are already being achieved in some Japanese manufacturing companies. Well-known management systems such as parallel planning, TQM, Kanban and Just-in-Time should be complemented by an emphasis on team working, communication and consultation, and reliance on human ingenuity rather than physical capital for solving problems. BESCO will have to adopt a culture which is significantly different from most existing BSE companies.

As the world of work changes, so too does vocational education and training (VET). During the past decade, however, the changes in the contributions expected of people at work have begun to outpace change in the offerings of Britain's colleges of further education.

In our experience, a significant number of employers have experienced a growing sense of frustration with courses in colleges. Many larger employers have felt compelled to pay for additional training in personal and inter-personal skills, and in "core" or "common" skills, to supplement technical knowledge and skill acquired at college, and company-specific training.

A growing number of colleges and award-making bodies have responded by adding personal skills to their menu of offerings, and by broadening learning processes away from "chalk and talk". But providers have felt frustrated by the apparently contradictory messages coming from different quarters.

By the late 1980s, it had become clear that industry and vocational education and training would need to work more closely in partnership. It was equally clear that "togetherness" would not be enough. Unless some way could be found of anticipating the future demands of the labour market and of translating these into appropriate learning processes and programmes, students would not be preparing themselves for the future. Neither employers nor students would view investment in vocational education and training as particularly cost-effective, either in the short term or the long term.

The need for such an approach was now all the more urgent, because some of Britain's major competitor countries had already made changes in their vocational education and training, in anticipation of the world of work to come.

Our purpose in this project – which involved three colleges, three occupations and eight different employers which all offered day-release VET – was to act as the catalyst for accelerating the pace of change and thereby diminish the mismatch between the VET which employers want (and colleges want to offer) and the VET which colleges offer (and employers want to support). Both literally and figuratively, our approach was to bring supply and demand together.

How the "innovative workplace" project aimed to contribute

Funded by the Employment Department, the Prospect Centre's aims were to propose a learning approach designed to respond to the widely expressed needs of businesses to employ people who are keen and who are capable of contributing creatively to the business now and in the future; people who accept and seek real responsibilities in the organisation. The project would

The need for a response from vocational education and training

"Some of Britain's major competitor countries had already made changes in their vocational education and training, in anticipation of the world of work to come"

Towards a new equilibrium

What we wanted to do

***"Create and design a
new concept and
implement these
principles"***

Where and how to start

***"Anticipate the
business environment
in which students would
be working"***

Guiding principles

break new ground in its concepts of "occupational capability" and "skills" and in its focus on the future.

However, this would not just be a project to create and design a new concept and then recommend what others ought to do. Its aim was also to **implement** these principles in three very different sets of college-employer circumstances, to learn from experience and then to transfer that learning to others.

The project had to provide extensive opportunities for company and college staffs to acquire a new understanding of the **changing business environment**. Arising from that, it had to envisage the occupational roles and the associated contributions which people would be expected to make. This would naturally raise issues about the appropriate skills/capabilities to be developed. For all of us, this would require new skills in designing and implementing a new type of **learning system**, to include new ways for the learner, the company and the college to assess results.

The first need was to anticipate the business environment of the future in which students would be working. Since it is employers which have to meet the challenges of rapid change, foreseeable trends and future uncertainties, they are in the best position to make such predictions. Senior managers in many companies know about the capabilities of their home and international competitors, about technological developments and systems integration, and about innovation in products and marketing. So we asked our employers to take the lead in creating this "vision" of the future.

Secondly, given what employers knew and could anticipate about the future, what would be their expectations of people in the particular **occupation**? For instance, many companies will be affected by legal and social pressures of environmental protection; by the single market; by continuous improvements in the quality of competitors' products; by the new situation created by the upheavals in Eastern Europe and the Soviet Union; and not least by more frequent unforeseen and unpredictable step changes. What (we asked employers) would this mean for the roles of people in, say, building services engineering or business administration?

The third step, again employer-led, was to identify the associated skill and capability requirements. Sometimes it is possible to establish one-for-one relations between such changes in the environment of a company and specific capabilities which a response requires, for instance contract management or effluent control. More often, future uncertainty and continuous change makes such a one-for-one link impossible to make. That is why people will need the skills to acquire new technical knowledge and skill, as well as what we would call "overarching capabilities". The latter must obviously include the ability to manage unfamiliar situations and solve unfamiliar problems.

It is worth saying a little more about the all-important "overarching capabilities" and how they are different from the more familiar concepts of skill. When "core skills" and "personal skills" were first identified, they were seen to consist of techniques which can be used in any context and are universally applicable. While that view has been modified here and there, it has become conventional wisdom in this country and the USA. As a result it has also become the basis for many education and training programmes.

A new term had to be found which described more than the ability to use specific techniques. It had to embrace the outlook, understanding and ways of working, i.e. the non-technical aspects of the occupation, which promote people's effective contributions to the organisation. To distinguish these, we coined the term "overarching capabilities". To our delight, all the employers in the project intuitively endorsed the importance of overarching capabilities.

They also supported the concept of "occupational capability". The relationship between these two concepts is shown in Figure 4 below, but is discussed in detail in Chapter III.

Figure 4

Overarching capabilities

The outlook, understanding and ways of working which promote people's effective contributions and facilitate organisational change in appropriate directions.

Occupational capability

The ability to integrate and use the occupation's technical knowledge, skills and overarching capabilities in response to, and anticipation of, changes in the work situation. ~

e.g. Problem solving,
creativity,
flexibility,
business thinking,
taking
responsibility.

© The Prospect Centre

Learning aims and learning designs

The first step had been to introduce and use some key concepts: the future-based business environment, the changed occupational role and the different occupational capabilities. The next question was how to bring all these concepts into a new system of learning.

The design and practice of existing UK education and training programmes rarely does this. However, we knew that industry and education in some competitor countries were well advanced in piloting such programmes. Therefore, one way of setting a benchmark was to look abroad for a quality

**"Quality two-year day
release programmes
leading to vocational
qualifications and a high
level of occupational
capability"**

product. We found a project in Germany (1), which is qualitatively different from best practice in the UK in its design principles and which responds, at the same time, to the ambitions of many leading British employers.

- (1) *A cooperative project for the education and training of apprentices in Industrial Business Administration undertaken by Volkswagen, the college of further education and the lecturer training department of the University of Goettingen. [Modellversuch WOKI, Wolfsburger Kooperationsmodell fuer den Ausbildungsberuf Industriekaufmann/frau unter besonderer Beruecksichtigung neuer Technologien].*

Our task was to use the design principles to match the outcomes of the German programme without attempting to copy the programme, since the UK does not share Germany's legal, institutional or cultural pre-conditions. However, we would seek to create serious, quality two-year day release programmes leading to vocational qualifications and a high level of occupational capability in a British environment.

The design framework would need to contain the following principles:

Figure 5

FRAMEWORK FOR PROGRAMME OUTCOMES

Students/trainees will be enabled to:

- have experience of "working" in, and contributing to, a simulated company of the future
- develop and use overarching capabilities which are needed to work effectively in their occupation
- develop systems thinking and the ability to solve problems in systems terms
- be able to use IT as a tool for managing situations
- have experience of joint performance assessment by college and company staff and be able to carry out self-assessment and peer-assessment
- acquire knowledge and skills as the need arises from working within a company's management systems (e.g. operations, finance, business planning), instead of acquiring them in a subject-based approach and meet the examination requirements of award-making bodies.

© The Prospect Centre

Roles - who, where, when

The project gave us the opportunity of working with eight companies of very different sizes, products and locations. None of the participants had ever attempted to "vision" their expectations of the particular occupations in which they are interested. Training needs analyses frequently focused on current production tasks and further education (FE) syllabuses focused on technical knowledge and skills. At best, VET was tailored to current job performance needs.

The project centred on three locations: Nottingham, Solihull and the Wirral. In each there was a cluster of a college of further education (CFE) and one or more companies.

Figure 6

FEATURES OF THE THREE COLLEGE/COMPANY CLUSTERS

Nottingham

- Building Services Engineering
- Basford Hall College with four small building services firms: Direct Technical Services, Field Associates, Haden Young, E.G. Phillips Son & Partners
- School leavers, aged 16 and 17
- Day release students
- Course BTEC accredited

Solihull

- Business Administration
- Solihull College of Technology with three very large companies: British Gas, Land Rover, Powergen
- School leavers aged 16 and 17
- Day release students
- Course BTEC accredited

The Wirral

- Flexible Manufacturing Systems
- Wirral Metropolitan College with one medium-sized subsidiary of an American company: Champion Sparking Plug
- Mature employee students
- Day release equivalent with flexible location of education and training
- Appropriate qualification still under discussion

The vision

The learning framework

What did they do?

Later, in Chapter III, we describe in some detail the way the project developed in the three clusters, the issues encountered by the three joint college/company groups and the Prospect Centre, and the lessons which were learned during the project. The rest of this chapter is addressed to those senior managers and training managers who want to know what they would have to do if they wished to achieve similar education and training outcomes in their companies. The chapter will also be helpful to college staff who design curricula and who manage innovative learning.

The work can be viewed as five distinct phases:

- The Vision
- The Learning Framework
- Planning
- Implementation
- Assessment

Earlier in this chapter, we describe the nature and importance of a "vision" of the future of the occupation. That meant finding people, in all companies, who could help in the visioning. We asked about the critical success factors of their businesses, about developments and plans in technology, about the competition and how it was changing and about changing customer expectations. What would the industry look like in a few years' time? How would this change occupational roles and skill requirements? What was missing from the current education and training programmes and what should be done about it?

In the small building services engineering companies, answering these questions involved directors and partners. In the large companies, senior managers and the participating training managers were able to contribute. Top management at the Champion company seized on the project concepts to advance and accelerate the company's transformation, in order to better confront international competition.

In all cases, the role of the consultants was crucial in explaining the new concepts, leading the debates, bringing together and interpreting the information.

Although the ways in which the joint groups worked in the three clusters were different, it is the "vision" which provides the substance for the overall learning framework and the learning aims.

The answers to these questions were used jointly by college staff, employers and ourselves to form a top-down view of the required learning framework. Working as a team, we used the information to develop the parameters of the simulated company of the future, to define the relevant overarching capabilities and to identify the company management systems which formed the backbone of the programme.

The joint groups learned to work together, sometimes overcoming deeply held views about each other. Using the learning aims which they had assembled, they designed and planned the "what, where, who, when and how" in order to translate them into practice both in-company and while students were at college. The design had to be flexible to take account of progressive learning by the designers and continuous feedback from the students.

Given the designs and plans, the joint groups put in place an integrated working system which translated the learning aims, designs and plans into practice. Projects and work experience had to be organised to exploit the facilities of the college and the companies to the best advantage.

Students' time in college (or equivalent) was planned around the business activities of the simulated company of the future. All three simulated companies – BESCO, TURBOMOW and SPARKY – were placed round 1997; sufficiently close to be meaningful and sufficiently distant to be different. Students have played a variety of roles in the simulated companies. They have helped in developing the characteristics and management systems of their company, or dealt with a contract awarded to their company, or solved a problem faced by their company. They had access to sources of technical knowledge and skills as and when these were needed. College staff also ensured that, where appropriate, the requirements of the examining bodies were met.

Two of the project's learning aims needed special attention. One was familiarity with, and use of, information technology as a tool in managing the affairs of the simulated company and in managing in-company projects. The second learning aim was the development of systems thinking, the use of systems in problem solving and an understanding of systems integration. Learning aids had to be found or constructed to foster these learning aims. If students were to develop specific overarching capabilities in practising their occupations (e.g. business awareness, managing unforeseen situations and acting responsibly), then the manner of learning had to support rather than undermine their confidence to act in new ways. To achieve this, college staff time had to be organised so that staff became a resource to learners. As a consequence, traditional formal teaching was reduced and student-centred forms of learning (which better reflect how people learn at work) were increased (e.g. simulation, role-playing).

"Working as a team, we used the information to develop the parameters of the simulated company of the future"

The planning stage

Implementation

"The design had to be flexible to take account of progressive learning by the designers and continuous feedback from the students"

"Empowering students to turn from being recipients of teaching to contributors to the learning process"

Assessment

"College and company staffs assessed students' achievement; students assess their own and their peers' achievements"

Costs and benefits

Empowering students to turn from being recipients of teaching to contributors to the learning process had a number of consequences. College and company staff invited them to make constructive criticisms of, and suggestions for, improving any matter relating to the programme (including questions of assessment). In all three clusters, positive responses from students greatly benefited the project.

There were two forms of assessment. Both were "continuous", i.e. they took place at milestones throughout the project. The first was the assessment of students, using a "multiple assessment format". The format had been jointly designed by each of the cluster groups to assess students' progress in the learning aims. The assessments were multiple because college and company staffs assessed students' achievement; multiple also, because students assessed their own and their peers' achievements.

A different form of assessment was applied, also continuously, to the development of the project itself. Feedback came from all participating groups. Frequently, future learning phases were re-planned as a result to make improvements.

What has been achieved?

The end of Chapter I is a convenient point for comparing existing VET with VET as it emerged in the project.

Figure 1, at the beginning of this report, shows some of the differences.

In September 1991, the students in Nottingham and Solihull started on the second year of their programme and also of their course for their vocational qualification. Students in the Wirral will complete their programme at the end of 1992. Therefore, a final evaluation of what has been achieved will have to wait until then. However, the evidence so far shows that the development of occupational capability can be achieved with students of different ages, backgrounds and occupations. Even at this stage, the added value for employers and students can be clearly demonstrated (see Figure 2 and Chapter II, for example).

It is also evident that successful implementation of the design principles implies a substantial learning process and commitment by college staff, company staff and whoever plays the role of consultant.

Designing and implementing the programmes in this project required a considerable investment of time from company and college staff and from students. There was also a considerable cost in consultants' fees.

For employers, the first question must be whether the results are worth having.

The employers in this project have no doubts – after all, they had a major hand in defining learning aims and objectives.

If asked, directors and senior managers in many other sectors would undoubtedly say that they are seeking the same types of attributes in their workforce. Many can point to significant real costs and opportunity costs which their businesses have already incurred, and will incur in the future, because the organisation is not there yet. One of the biggest opportunity costs is in wasted time and its consequences.

Colleges cannot move forward on their own. Like companies, they have to generate revenues and satisfy customers. Only if their employer-customers are prepared to become involved will they be in a position to change.

The question for many employers is whether they are ready to join forces with other employers and with their suppliers of vocational education and training in a true strategic alliance. To do this, they must be convinced that the costs of inappropriate output from colleges will outweigh the costs of learning to get it right.

One way to view this is to look at the benefits which the employers involved in this project have gained:

- (a) directors and managers on the cluster teams all recognise that they have significantly developed their strategic and management competence through their active participation in the work;
- (b) the companies involved have built strong strategic partnerships with an important supplier;
- (c) each can already see a key group making an enhanced contribution to the business.

A rough estimate of the costs to develop an Innovative Workforce programme suggests that the cost per cluster for college and consultant time comes to the equivalent of ten places on a four week business school executive development programme. Now that the groundwork has been prepared, costs are likely to be less. For companies which are concerned only about the development of their managers, this might appear a high price. Those which see a highly capable workforce as a core business need for the future will consider the money well spent.

"The question for many employers is whether they are ready to join forces ... with their suppliers of vocational education and training in a true strategic alliance"

"Those which see a highly capable workforce as a core business need for the future will consider the money well spent"

Chapter II

SOME IMPRESSIONS... NOTTINGHAM, SOLIHULL, THE WIRRAL



***"Traditional education
approaches somehow
needed changing"***

***"The project was
pushing on an
open door"***

Developing a robust partnership for the future

In the space of two years, one stream of the Building Services Engineering day-release BTEC at Basford Hall College, Nottingham has changed from a traditional course, concentrating on teaching technical subjects, to a programme which all those involved agree is preparing its students for the future occupation of building services engineer.

At the heart of this transformation has been a visionary and pro-active steering group of college and company staff. For them, the 'Innovative Workforce' project has provided the opportunity and the concepts which had previously been missing from the development jigsaw.

Roy Whiting, the head of department, was attracted by the possibility that further education could avoid adopting an increasingly narrow approach to skills. One of his lecturers, who had recently come from industry, was keen to pick up new approaches.

From local companies who employ and train building services engineers came a director who is also a governor of the college. He brought a personal commitment to education and a desire to inject 'business skills' into the curriculum.

A second member is an engineer with a clear commitment to improving the relevance and academic rigour of the technical curriculum. A third member had recently left the college to become a partner in a firm. For him, building services engineers have to become more conscious of information technology because this is the direction of the future.

For all the steering group members, there was a growing feeling that traditional education approaches somehow needed changing, to enable youngsters to become more effective, more quickly.

From the first meeting, the employers were active in bringing their industrial/commercial experience to bear on the project. Although unsure about the comprehensive character of the approach, they intuitively understood the importance of the underlying principles to company survival and success. The project was pushing on an open door.

The group quickly got down to defining the main features of "BESCO", the building services engineering company of tomorrow in which the students of today can expect to work. Initially, the proposition that BESCO would be a systems-integrated company came as a bit of a shock to some, since many of today's small companies have modest IT facilities. However, one group member's company was already fairly high-tech; everyone in the group

learned not only about tomorrow's technology, but also about best practice today. A systems-integrated company never felt like science fiction.

These discussions led everyone to recognise that the building services engineer's roles and responsibilities in tomorrow's BESCO would be markedly different from those which were assumed on the traditional Basford course. As one member put it at the time: "90 per cent of the engineer's work today is less about the technical things dominating the curriculum and more about interfacing with colleagues, customers and suppliers, and managing people and situations – without ever taking your eye off the business issues."

From this observation came the 'overarching' capabilities which the programme now sets out to develop. Already vital, they will in future become critical. "We must never neglect the basics of engineering skills and understanding. We also have to keep up with the technology. But what will increasingly make the difference between companies will be the capabilities of their staff – and the major difference will be their 'overarching' capabilities – like systems thinking, business thinking and acceptance of responsibility."

The group soon realised that it ought to be possible to hasten the development of these capabilities through focused learning in college, instead of relying mainly on traditional unstructured 'learning by doing' on the job. They could see that the best place to do this would be the two hours per week "working in BESCO".

Much of the implementation fell to college members of the steering group. For them, this became a significant learning challenge. They had to learn about how their students' companies operate, in addition to being on top of their subjects. They had to commit themselves not just to getting across traditional technical knowledge and skills, but to finding new ways of developing new capabilities in students.

Instead of first teaching subjects and then asking students to apply them in an Integrative Assignment, they had to start from BESCO and change the timing (and sometimes the content) of the college curriculum, to ensure that students drew on those skills and that knowledge at each stage of their work in BESCO. They had to emphasise the use of IT and the development of 'overarching' capabilities wherever possible. And they had to "teach" differently; BESCO required a move into student-centred learning.

The first day of the new programme, in September 1990, turned out to be a black (and almost fatal) one. Three of the four employers on the steering group had not been able to recruit trainees. The special "OCCAP class" had to be made up from other companies' trainees. Not all of the students remained and

"A systems-integrated company never felt like science fiction"

"Systems thinking, business thinking and acceptance of responsibility"

"Finding new ways of developing new capabilities in students"

"BESCO required a move into student-centred learning"



others had to be substituted. At the same time, the recession began to bite and companies struggling for survival found it difficult to allocate the time and resource for the agreed periods of students' work-based learning (two hours per week). Nonetheless, the programme is still up and running. Indeed, for 1991/2 the steering group has decided to expand to six employers, each with a student on the programme.

And the students? They are excited by the emphasis on IT and take naturally to "working in the future". For them it is obvious: "We need to understand our occupation for the future" and "I can go back to my company and inform senior people how we have to change to keep up with other companies". They welcome being involved in assessing themselves, their colleagues and the whole curriculum, alongside company and college staff. Perhaps most of all, they value the experience for preparing them better for their future careers.

Building a design for accelerating development in further education

In 1989, Barbara Sloan, the Vice-Principal of Solihull College of Technology (SCOT), was looking to spread the team-teaching, project-based approach to learning which had been developed, with dramatic results, in the College's Travel and Tourism curriculum. The 'Innovative Workforce' concept offered the chance to integrate other lecturers with the group who had developed this approach. The chosen vehicle would be a re-design of the day-release Business and Finance BTEC offered by the college.



At the same time, several of SCOT's local client companies were undergoing major change in their own business direction. They were keen to understand better how further education operates and to find out how it could be more closely tailored to their future company needs. In particular, Powergen, Land Rover and British Gas, who all intended to use the college for business administration education, wanted to be involved.

Two years later, in the summer of 1991, a group of twelve trainees from the three companies are half-way through a Business and Finance BTEC that has more than exceeded initial expectations. Spending one and a half days per week on the college-based part of the programme, rather than the normal day, the trainees – who are all 16 or 17 years-old – are having an experience which, in the view of both the company training managers and college staff on the project steering group, has speeded up their learning. "The trainees are at the equivalent level to second-year students, although they are only at the end of their first year."

There is general agreement that the trainees have developed an outlook and understanding which their employers want, but could not expect from a traditional further education course. They have developed a view about their company as a whole, they think and talk about the future, they are beginning to use systems thinking in problem-solving at college and at work, and they expect to use IT as an everyday management tool; all in addition to progressing at a more than satisfactory pace through the BTEC syllabus.

As hoped, business-based projects and team-teaching have both become key features of the curriculum, but the overall design has embedded these learning processes within a new framework which emphasises occupational capability for the future:

- the curriculum has not been organised around traditional academic subjects, but rather around six key learning milestones which are in fact business strategies (e.g. Green policy, the market, production)
- projects are linked to trainees' future roles and to each of the milestones, and in the first year they have led up to the creation of a business plan for the setting up of a lawnmower manufacturing company at a time six years in the future; in their second year, they will set up and work in this simulated company
- the BTEC syllabus and IT training have been introduced when they are appropriate to support projects and learning milestones and not as stand-alone subjects
- the curriculum planning process includes both college and company staff and has developed an explicit set of 'overarching' capabilities which members of the occupation will need in the future; trainees assess their own development of these capabilities at each milestone review
- company staff, lecturers and trainees themselves jointly assess trainees' progress and learning at each milestone, using pre-prepared criteria; trainees assess their peers as well as themselves.

"All in addition to progressing at a more than satisfactory pace through the BTEC syllabus"

British Gas
West Midlands

"Six key learning milestones"



***"Give the simulated
company an explicitly
international brief"***



***"More active involvement
by supervisors and
managers"***

Despite these considerable achievements, college staff and company training managers are agreed that there is still more work to be done. The European dimension is looming large and there is an intention to give the simulated company an explicitly international brief. College staff are also exploring how to integrate the use of languages other than English into everyday coursework. In addition, now that the new learning aims and objectives are clearer, it would be possible to provide more structure and fuller briefings to trainees for each part of the programme.

The new learning design still presents challenges in integrating some parts of the syllabus to achieve the overall learning aims. As one example, trainees initially produced a financially unrealistic business plan for their future lawnmower company. Their analysis of the causes suggests that finance is one area where more integration is needed.

For college staff, the most important achievements to date have undoubtedly been the emphasis on the future in the whole of the learning process, and the good working relationships they have developed with the employer representatives who have been involved.

For their part, the training managers from the companies are delighted that 'overarching' capabilities are now seriously on the learning agenda. They see their active involvement in the learning process as a major gain, and feel that they now understand what students actually do at college. They are starting to realise a need for more active involvement by supervisors and managers in their companies, if all parties are to gain optimum benefits from the programme.

"I wouldn't say the experience has been easy. When we started, we had very little idea about how high our aspirations of FE could be. But the experience has given us a challenging direction and framework, and a supportive process, and we have all learned a great deal.

"Five years ago, I wouldn't have expected 25 year-olds to be capable of the things our 16 and 17 year-old trainees are doing today."

Developing capability for the future

The Champion Sparking Plug Company has big plans for the future. One of its medium-term objectives in realising these plans will be the introduction of production processes based around flexible manufacturing systems. This move will create an obvious need for retraining by almost everyone in the business.



In 1989, senior managers in the company's UK operations in the Wirral could see that this retraining need was obvious. What was less obvious was where to start, the competence and capabilities that would need to be developed, and how best these needs could be met.

The Wirral Metropolitan College is on the company's doorstep. In 1989, staff at the college already had a tradition of going out to employers, of listening to their training needs and of proposing education and training solutions. In Champion, they found a company that knew it had needs but was not sure what they were.

Under such circumstances, the first task was not to design a training solution but to clarify what would be needed. The usual approach would have been to clarify needs progressively through an iterative process of offering up possible training solutions and subjecting them to a critique by company managers. The results of each critique could then be taken back to the 'drawing board'.

Champion's managers on its 'Innovative Workforce' steering group chose an alternative route. They saw that the changes they would be introducing would be radical; they felt that the usual incremental approach ran the risk of missing the most important developments that would be called for. While they were clear about their manufacturing intentions, they were not yet clear about the implications of those intentions.

Therefore, an early step was the creation of a learning process for both managers on the steering group and the lecturer who had been assigned to coordinate the college's response to their requirements. Champion will not be the first company to introduce flexible manufacturing, so what could the experience of others say about the competence and capability that would be required? Moreover, Champion will be in competition with other major spark plug manufacturers who are renowned for their flexible manufacturing. Were there any lessons for the UK and Europe?

"The usual incremental approach ran the risk of missing the most important developments"



***"Company managers
could now articulate the
competence and
capabilities they would
need"***

***"This first group of
students are adults, from
a diversity of educational
backgrounds"***

***"This has not been part of
the traditional company
culture"***

The process eventually took a year of exploration and reflection, but it was worthwhile. "It's not that it told us things we didn't know but it has enabled us to see them quite differently," was the company's general conclusion.

With these insights, Champion was in a position to start moving fast. Future manufacturing cell leaders were identified as the first target for focused development. Company managers could now articulate the competence and capabilities they would need. Key issues and processes in flexible manufacturing systems of the future had also become apparent. Simulated experience of future responsibilities would thus be possible and desirable, and the overall shape of the required learning experience for future cell leaders became clearer.

A two-year, one day per week, programme was designed for fourteen employees who had been identified as the first group of potential future cell leaders. All of this first group of "students" are adults, and have worked for Champion for a number of years. They come from a diversity of educational backgrounds. The programme is now running and being managed by a monthly review group composed of managers, lecturers and students. Students are both chairing the group and acting as its secretary.

"We have had enormous benefits so far from this experience," says John Hogg, Champion's training manager. "Our employees have delighted us with their motivation to learn and their keenness to ask questions and to take on new responsibilities, particularly because this has not been part of the traditional company culture.

"Because of the process we have used to develop the programme, we have been able to anticipate some of the management implications for the future. As a result, we are more prepared when they start to happen. In the programme itself, we are all starting to operate as we will be expected to operate in the future.

"On a wider scale, this project has provided opportunities for the company and the college to cooperate on other initiatives to realise our strategic plans. Our company-wide language training and training in the use of information technology are just two examples of this cooperation.

"I believe the college staff who worked with us have learned too, about the speed of change these days and the importance of paying attention to the future, about the potential of people who are not your traditional student, and about how difficult it is to apply theoretical knowledge in the workplace.

"But we are not there yet. Our students' first two terms have really been part of an induction process. The emphasis has been on how to study, on

communication and on using IT. Students have had some experience of working in teams to learn to handle their future roles, but SPARKY (our simulated company of the future) will be much more at the core of the learning for all of us in the coming year. This means we will all be learning how to manage a design that puts the competence and capability to carry future responsibilities at the heart of the learning experience."

Chapter III

LEARNING LESSONS... WHAT WORKED AND WHAT DID NOT

"The lessons – in the form of 'learning points' –"

Learning points

Introduction

Chapter I gave an overview. It showed why "growing an innovative workforce" has become an important management issue in forward looking businesses. It also described an education and training framework which responds to the needs of such businesses and the added value it can offer.

Chapter II gives an impression, in three vignettes, of what can happen and what can be achieved.

This chapter describes what we have learned, and how an "innovative workforce" programme can best be developed. Taking each of the characteristics of such a programme as outlined in Chapter I, we shall draw attention to the lessons – in the form of "Learning Points" – associated with each of them. These learning points are the fruits of the experience of implementing the programme: what went well and what went not so well.

Managing the process of joint working between colleges and companies

Figure 7

- 1 Ensure all college staff who could be significantly involved in the design and delivery of the programme are on the project team.
- 2 Articulate a sense of direction and ways of charting progress.
- 3 Agree an explicit statement of ground rules, and of the rights, roles and responsibilities of the project team members at the start; if possible, include 'learning' as everyone's responsibility.
- 4 Carry out a diagnosis of the current understanding and experience of project team members at the start, and use this to create a learning programme for the team.
- 5 Identify people with relevant expertise who can be called on, if project team members need assistance in creating, designing or implementing particular parts of the initiative.
- 6 Use a third party throughout the work of the project team to act as a holder of 'the vision' of the overall aims of the initiative, and of its vital parts; expect the third party to act as a facilitator, arbitrator and peacemaker.
- 7 Plan to involve learners in the process at an early point.
- 8 Expect the project to run for at least two years if programme development is to be self-sustaining.

The Innovative Workforce clusters started with Basford Hall College, Solihull College of Technology and the Metropolitan College of the Wirral. All three had expressed interest in taking part. They had been approached by the Prospect Centre as a result of an earlier feasibility study (supported by ED) and because of their open-mindedness and willingness to experiment, and because they offered programmes to day-release students.

The employers in each cluster were recruited by college staff who drew on their knowledge of local industry. In general, when the members of the three clusters first met, there was a great deal of enthusiasm for the purposes of the project. But there were significant differences between the clusters in the degree of clarity about what they were trying to build. There were very different perceptions about the need for, and the nature of, the milestones to be achieved along the way.

One of the reasons for this lack of clarity arose from the differing agendas of the various parties. While employers and colleges had collaborated in the past, they had had no experience of 'joint ventures' with each other. They were used to pursuing the point of view of one party, or of another, but not of pursuing multiple interests at the same time.

A second reason was the nature of the planning task which would be needed to implement this initiative. The initiative was extensive and, at the same time, innovative. It required a different planning process from that with which the participants were familiar. First the overall goal needed to be understood, accepted and shared. Then, the next step had to be defined and its achievements planned for. Still working towards the overall goal, subsequent steps would have to be decided, by building on the greater clarity and experience gained.

For example, some members of the Solihull cluster expressed concern at the length and extent of the initial planning stage. They would have preferred to move more quickly into the design of learning processes. It took over six months to agree that overall goals were needed, and to begin to articulate them. Neither college staff nor company training managers had had experience of articulating overall outcomes before nor had they had experience of linking learning to the future direction of an occupation.

By contrast, building services engineering is an occupation in which planning is an important ingredient. In Nottingham, the partners expected to answer the questions "What are we trying to achieve?" and "What milestones need to be planned?" as first steps. They spent the early project meetings linking "What are we trying to achieve" with a view of the future of their industry and the future roles of their students.

"The differing agendas of the various parties"

"Not used to pursuing multiple interests at the same time"

"The overall goal needed to be understood, accepted and shared and achievements planned for"

Figure 8

A CHECKLIST FOR PROGRESS

FORMULATING LEARNING AIMS

- Key technical and overarching capabilities (OACs) in the light of known trends and likely discontinuities
- Descriptions of organisational roles to be played by the occupation now and in the future
- Learning outcomes set by awarding bodies, for example, BTEC – NVQs

DESIGNING LEARNING SYSTEMS

- The parameters of a simulated company of the mid-1990s
- A plan for learning experiences which develop specific OACs
- A plan for the 'best' locations for specific learning activities
- Plans for learning organised around management processes rather than academic subjects
- A plan for ensuring occupational capability which enables learners to work professionally in any company
- Plans for projects to be carried out individually or in teams to understand company management systems and compare them with the simulated company
- Plans for IT to be used as a tool and not to be treated as a subject
- Consideration of including, and allowing time for, a foreign language
- All vocational qualification requirements are included
- A commitment by companies and college to implement the agreed design
- Identification of teachers' and trainers' learning needs
- Plans for considering and acting on student views and feedback as part of the implementation system
- Time allocated to GIW in colleges and companies
- Phases of company operations and milestones for assessment
- A design of the assessment system – a blueprint which includes criteria for student achievement

SELECTING STUDENTS/ TRAINEES

- A group of sufficient size

IMPLEMENTING THE LEARNING PROGRAMME

- A working system with observable features which realises learning aims and designs, ie:
 - Projects and work experience are organised
 - Students' time in college is planned around the simulated company's business activities
 - Learning aids are found and devised, particularly technology which integrates existing stand alone systems
 - Staff time is organised so that staff are a resource to learners rather than stand up teachers
 - Projects are carried out individually or in teams to understand company management systems and compare them with the simulated company
 - IT used as a tool
 - There may be access to learning a foreign language
 - All vocational qualification requirements are met
 - Student suggestions are incorporated
 - Criteria for assessing student achievements (eg OACs)
 - Student achievements are assessed

ASSESSING LEARNERS AND SYSTEMS

- Records of students' progress in OACs, VQ requirements plus other learning aims, assessed at milestones and also using the results of project and simulation activities in both college and company

It took the Prospect Centre consultants some time to realise that if all the clusters had had a planning framework at the beginning, progress might have been faster. As a result, we have constructed such a framework (see Figure 8), and used it in all the clusters. This framework, which is a model of a learning system, outlines the stages of achievement required if any new learning programme is to be successfully developed. Within that, it specifies the achievements which make the Innovative Workforce learning programme distinctive.

This framework, together with the criteria in Figure 5 (see page 8) – the “Framework for Programme Outcomes” – offer a direction and master plan for others to use.

Because of the high degree of uncertainty surrounding what was to be achieved, no one had a clear vision of what the result would look like or be like in practice. At the same time, no one knew what would in fact help or hinder progress.

Initially, cluster projects teams were meeting every two weeks or so. In the meantime, the consultants were gathering thoughts and information to bring back to the group. Only after some progress had been made and some difficulties had been encountered, was it possible to use hindsight to see how conditions could have been improved from the start.

With hindsight, it is clear that more time could have been spent in the early days on clarifying, reviewing and practising how the team members would be expected to work, and to work together. More time could also have been spent in clarifying roles and responsibilities. This might have avoided some of the competition, anxiety and frustration which inhibited progress at the beginning. It might also have pointed up a need for more people to join the project team because there would be the possibility of their involvement with the new programme as it was progressively implemented.

In the early days, most project team members came to the cluster with the belief that they had something to give and an underestimation of what they might learn. The available reports of similar work came from Germany. Even in English, they could not easily be translated into the situation in which cluster members found themselves. With the overall framework in Figure 8, and this report, it would now be possible for a new cluster to agree to start by considering the individual and collective learning needs of the team members. It would also be possible to create learning plans and build in regular reviews as the project unfolds.

With more time spent planning the process for programme development, it would be more likely that team members would anticipate potential difficulties

“No one knew what would help or hinder progress”

“With hindsight”

“Something to give and an underestimation of what they might learn”

EXHIBIT

"Visioning future cell leaders"

CELL Leaders

CATEGORY	WESTERN	JAPANESE
Priority	Top priority: line balancing	Top priority: flexibility
Strategy	Stability with long production runs to minimise need to rebalance	Flexibility expecting to rebalance often to match output with changing demand
Labour Assignments	Highly specialised people Labour assignments are assumed to be fixed	Flexible labour moved to where current workload or problem is located Work schedule levelling
Equipment	Inventory to cushion effect	Maximum preventative maintenance to prevent breakdown

CELL Leaders

CATEGORY	WESTERN	JAPANESE
Problem solving	Sophisticated analysis (eg computers) off-line	Human ingenuity to use flexibility round bottlenecks Involvement of all workforce
Planning	Done by remote staff	'Supervisor' leads design effort and will adjust plan as needed to changing demand
Quality	Plan to run at fixed rate, sending quality problems off-line	Slow line when quality problems arise; speed up when quality is high operator can stop line
Conveyors	Desirable for transporting material	Avoid – position work stations close together

CELL Leaders

Consequences of future change

The organisation needs to develop:

eg information systems managing

MRP II and/or Kanban

The cell leader needs to develop:

Mini-enterprise managing

satisfy customers

networking

and look for ways to minimise them. This might mean, for example, that project team members would have been more open in the early days to looking for contributions from people outside the team with particular areas of expertise.

After the first year of development work, the first students were recruited to all of the Innovative Workforce programmes. By this time, both the Solihull cluster and the Wirral cluster were ready to involve them in the process of programme development. Feedback and joint problem-solving from students has been a spur to further development. This feature is particularly important to anticipate and build in as soon as reasonably possible.

Given the dynamics of the cluster teams at the start of each of the projects, it is hard to see that much progress would have been made without a neutral third party who had considerable understanding of, and commitment to, what they were trying to achieve. The consultants to the clusters acted as coordinators and facilitators; they acted as arbitrators; they acted as peacemakers; they acted as agents provocateurs. They acted as information gatherers, as soundingboards and as tutors. They intervened with senior college management on behalf of the cluster. In the process they too learned more about how to be 'learning managers'.

Just over two years have gone by since the Innovative Workforce project began. Even with better planning, the first year would have been needed for learning and for designing the new programme concept. Even now, each cluster has run no more than one year of a new programme. The learning curve is still relatively steep. By now, however, the clusters can see the first results of their efforts in the achievements of those on their programmes, and they are committed to going on.

Visioning the future

Figure 9

- 1 Gain access to people who have an understanding of likely future changes in the business environment and of their impact on the organisation of work.
- 2 Prepare a framework of questions to draw out this knowledge and understanding, for use as the starting point for the development of learning aims and objectives.
- 3 Do not expect senior managers to prescribe the content and processes of education and training for the future; do not expect training managers and college lecturers to assess future business strategies.

*"Feedback and joint
problem-solving
from students"*

Learning points

Why visioning the future is important

"A future significantly different from the present and often full of surprises"

A future-oriented learning programme relies on visions about the demands on an occupation in the future, and on views about the situations which members of that occupation are likely to be managing. Such visions have frequently taken insufficient account of the likely future impact of change in the business environment, and resulting business strategies. In many industries, senior managers now anticipate a future that will be significantly different from the present, and often full of surprises.

At Champion Sparking Plug in the Wirral, for example, senior managers could see growing competition in the replacement market and the entry of worldwide competitors who were fundamentally re-thinking their manufacturing processes, and investing heavily in product and process development. They saw a need for their own company to respond more flexibly to customer demand and to use their achievements in technical development to enhance their customers' products. Zero-defect manufacturing and a move from mass production to customised products were seen as important steps.

In Nottingham, senior managers of building services engineering companies anticipated that large construction companies would come to dominate the large-projects sector of the market. The integrated service provided by these large companies would lead other parts of the market to increasingly expect more integrated packages of services. Small, and more highly-specialised, firms would have to respond by networking, strategic alliances and joint ventures. On the technology front, it was anticipated that computer-aided design would become more integrated with the quotation and project management functions of the businesses. An ever-increasing proportion of the time of building services engineers would be spent on non-technical activities.

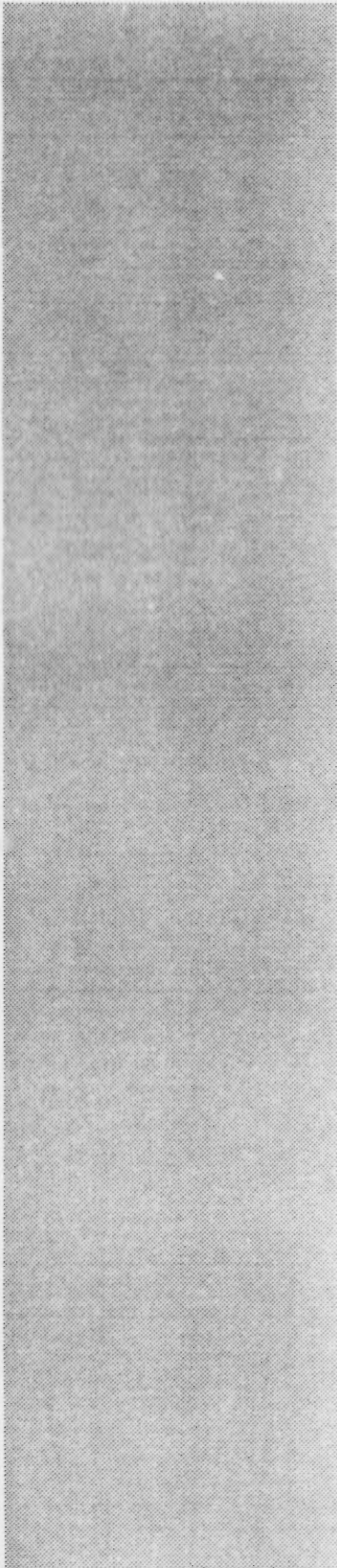
In Nottingham, because of the small size of the local companies (or local branches), it was easy to identify whose views of the future needed to be tapped – and they were on the cluster team. These individuals were first interviewed separately, and then meetings of the steering group were used to arrive at shared views. In the Wirral, a meeting with top management was followed by a one-day workshop with senior managers, the training manager and a member of staff from the college. Discussions also took place with leading thinkers about manufacturing systems, and with production managers in companies using flexible manufacturing systems. In Solihull, interviews identified one senior manager in particular who, because of his job, had a well-developed view which he contributed to the cluster project team.

The clusters' experience demonstrated that many senior managers are not in the habit of discussing future business challenges and their implications for the roles of people at work. It is not that they have no views. Given a framework, they were forthcoming and had plenty to say. Because of the nature of the

project, the clusters tended to avoid the temptation to go further. They held back from asking senior managers to tell the team what content and processes they expected in the programme.

However, the planning content and processes were made easier in Nottingham and the Wirral, where senior managers were on the cluster team. This enabled the college lecturers at Basford, and the training manager at Champion, to test their emerging designs against business reality.

At Solihull, the process was more complex, in part because of the size and nature of the companies. The training managers needed to gain access to, and secure the support of, senior managers. It took time to negotiate the availability of some business information and issues of confidentiality were more significant.



'We are quite clear that an assessment of knowledge, technical skills and business skills is not enough. In our move to a new manufacturing system, we need people who have their eyes on the ball and who can make things happen.'

John Hogg, Training Manager, Champion Spark Plug Europe

Overarching capabilities

Figure 10

- 1 Overarching capabilities are very appealing to employers.
- 2 Producing a high-quality set is not easy, because most steering group members will not have thought in detail about the occupation in question or its future.
- 3 Because of this, it may be better to use detailed analysis and expertise, rather than brainstorming, to generate overarching capabilities.
- 4 Programme designers are likely to need help in the design of modules of learning which include the development of overarching capabilities, and in the design of frameworks to assess their development.
- 5 Persistence is a key to success.

© The Prospect Centre

In a work environment where people are expected to manage situations and make creative contributions, it is not enough to be able to follow procedures and instructions. People need to bring something more to their job.

What is this something? It used to be called "common sense". Looked at more closely, however, this "common sense" has a number of elements. It includes ways of thinking, eg "I have a problem here. What's causing it, and how should I solve it?" It also includes ways of working, eg playing an effective part in a team. It includes understanding, eg "If I change this, what are the likely commercial consequences for the business?" It includes values and an outlook, eg a commitment to getting things right first time, or a desire for continuous improvement. It is more than skills, and more than a habit of mind or behaviour, although it embraces both. It is the vital ingredient which enables people to use their knowledge and experience constructively for a purpose. It is that 'something' which enables people to play new roles and take new responsibilities effectively. Together, these are the 'overarching capabilities' a person needs if he or she is to play pro-active roles successfully.

The CBI has recognised this by producing a list of 'common learning outcomes' which all education and training should seek to develop. It is tempting to think of these as un-related to the work at hand. This could be seen to imply that a person who has learned to solve problems associated with satisfying airline customers should be expected to be able to solve problems connected with the performance of an aircraft engine. There is clearly something wrong with this conclusion.

Learning points

**Why are
overarching
capabilities
important?**

***"People are expected
to manage situations
and make creative
contributions"***

***"Play pro-active
roles successfully"***

EXHIBIT

Overarching occupational capabilities for administrative and commercial staff (OACs) (translation)

*From a paper by Professor Peter Diepold of Goettingen University:
'Entwicklungstendenzen der Lernorte in der kaufmaennischen Berufsausbildung
und Auswirkungen auf die paedagogische Qualifizierung des Personals', 1989.*

1 Business Thinking

- Recognise overlapping internal company relationships
- Know about the structure and organisation of work
- Plan with a notion of cost and quality
- Set priorities

2 Problem-solving and decision-making ability

- Analyse situations
- Recognise potential problems
- Pursue causes of developments
- Prepare, formulate and evaluate alternative solutions
- Prepare and evaluate information
- Make and justify decisions

3 Communication and co-operation ability

- Present facts of a case clearly
- Co-operate constructively in discussions
- Demonstrate willingness to establish contact
- Negotiate effectively
- Develop the ability to compromise
- Work in a team

4 Initiative and responsibility

- Develop initiatives
- develop independence
- set own goals
- demonstrate active learning (generate own questions)
- contribute to the organisation of work

5 Flexibility and creativity

- Show versatility in thought and action
- Be open to new developments
- Develop new concepts
- Show readiness for continuing learning
- Apply sensibly techniques for learning and work.

It is not just that a person's base of knowledge and technical skill needs to be different in these two situations. More fundamentally, there are also important differences in the ways of thinking, ways of working, understanding and outlook which are called for. These differences are all related to the fact that the person who is expected to handle customers is working in a different occupation from the person who is working on aircraft engines. Different occupations call for different overarching capabilities. Overarching capabilities are intimately bound up with the responsibilities and tasks of a particular occupation.

Traditionally, vocational education and training have not been designed either to develop or assess these overarching capabilities which are needed in the occupation. Good teachers and good managers have always been concerned with them but they have not been an explicit part of the curriculum. If a programme is to enable learners to play their roles in an occupation, now and in the future, the development and assessment of relevant overarching capabilities must be an essential part of the curriculum.

When company managers heard that the development of overarching capabilities was to be a key feature of the 'Innovative Workforce' projects, they were delighted. As one said, "The current syllabus only covers 10% of what people do in their real jobs!"

Turning enthusiasm into a view about the overarching capabilities which would act as learning objectives was not a straightforward task. There were several issues. First, everyone had something to contribute. At one point, there were four pages of overarching capabilities in the Solihull project. Secondly, there was a tendency to produce attributes which described free-floating paragons of virtue, unconnected with real-world roles and responsibilities. Thirdly, there was a certain amount of initial rivalry between different companies, and between company staff and college staff, each of whom wanted their own views to predominate. Fourthly, while people were happy to talk at length about the capabilities needed today, they were much less articulate about the capabilities which would be needed in the future. Fifthly, if project group members had never worked in the occupation themselves, they could speak as 'customers' but did not have the 'inside' experience to describe what a person would need to bring to situations.

Three different approaches were used to move the issue forward. In two of the clusters, the project group was shown a set of overarching capabilities that had been developed for administration occupations in Germany (see Figure 11). Lists that had been produced by the cluster were compared with this set, and the home-grown lists were whittled down to a manageable number of essentials, in order to move forward. At the same time, the consultant worked as a facilitator to ensure that all parties felt that their views were being accommodated.

***"Different occupations
call for different
overarching
capabilities"***

***The clusters'
experience***

***"Free-floating
paragons of
virtue"***

EXHIBIT

**BASFORD HALL COLLEGE
EVALUATION OF OCCAP LEARNING AIDS
BESCO, A BSE COMPANY OF 1997**

1 During the GIW course, how often did you make use of the Learning Aid listed above?

(Please tick appropriate box)

- (a) Frequently ☐ (b) Infrequently ☐
(c) Not at all ☐

If you ticked box (a) or (b), please carry on to question 2

2 How useful did you find this Learning Aid?

(Please tick appropriate box)

- (a) Very useful ☐ (b) Of some use ☐
(c) Of no use ☐

If you ticked box (a) or (b), please carry on to question 3. If you ticked box (c), please go straight to question 4

3 In what ways did you find the Learning Aid useful?

(Please tick any of the boxes which apply)

- (a) It gave insight into working in building services in the future ☐
(b) It suggested contrasts with working in building services engineering today ☐
(c) It made the course more interesting. ☐
(d) It helped in the development of 'overarching capabilities' ☐
(e) It helped to give a better understanding of systems integration ☐
(f) In other way(s) *(Please specify)* _____

4 In your view, could this Learning Aid be modified to make it more useful for any of the following purposes?

- (a) To give better insight into working in building services in the future ☐
(b) To bring out clearer contrasts with working in building services engineering today ☐
(c) To make the course more interesting ☐
(d) To be more helpful in the development of 'overarching capabilities' ☐
(e) To help give a better understanding of systems integration ☐
(f) To achieve some other purpose(s) *(Please specify)* _____

If you ticked any box(es), please carry on to question 5. If not, please answer no more questions

5 In what ways do you believe this learning aid should be modified, to achieve the purpose(s) ticked above?

(Please give a brief outline of the necessary changes) _____

6 Who should be involved in the modification of this Learning Aid?

(Please tick any of the boxes which apply)

- (a) Students ☐ (b) College staff ☐
(c) Company staff ☐

7 Do you believe students on 'normal' (non-GIW) BSE courses would benefit from access to this learning aid?

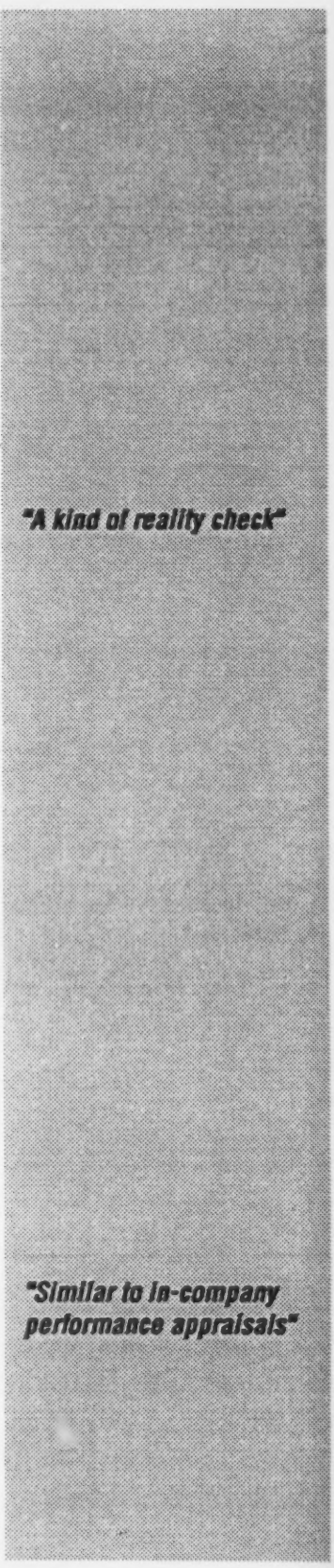
(Please tick appropriate box) Yes ☐ No ☐ Don't know ☐

In the Wirral, the cluster adopted a more formal process which was closer to the approach used in Germany to identify key overarching capabilities. In Germany, these capabilities had been identified as a result of an in-depth study of the occupation, now and in the future. The cluster in the Wirral started by looking at flexible manufacturing cell systems in practice in other companies, particularly Japanese companies, and comparing this experience with their own company plans. They then deduced the relevant overarching capabilities for cell leaders. This resulted in a manageable set of categories which had obvious connections to the occupation in question.

The third approach which was adopted was a kind of 'reality check'. Since the overarching capabilities were intended to be one focus for the design of the programme, participants were regularly asked "What situations would we have to create to enable learners to develop and use this capability?" From the answers to this question, it was clear that not everything could be included. When it came time to actually use the overarching capabilities for design purposes, a second set of issues arose. In one case, the lecturers wanted to make the capabilities into a separate course. In another, the stance was taken that there was no need to plan for their development, because they were all-pervasive and would emerge by themselves. It became apparent that the lecturers had never been asked to undertake this task before. There was also considerable reluctance to accept help.

In addition to the consultants' persistence with the issue, three developments finally had an impact. In the Wirral, the training manager at Champion could see how to do it and decided to take responsibility for the design of the modules. At Basford, lecturers moved from being 'instructors' to being 'learning managers' as a result of the use of BESCO, the simulated building service engineering company of the future. This generated ideas about how to plan for the development of overarching capabilities. At Solihull, the issues arising from the assessment of learners' performance has led to increased planning for capability development.

A third set of issues presented themselves when it became necessary to design and use an assessment format. Some college lecturers felt uneasy about moving away from 'scientific' assessment. Some felt uneasy about assessing the **inputs and processes** learners were using in their work as well as the output. Some were reluctant to specify the overarching capabilities which particular blocks of work were designed to develop. In the Wirral, the cluster initially held back from a decision about the qualification which would be most appropriate for their programme. This allowed the early assessments to be influenced more by approaches to in-company performance appraisals than by the requirements of an external validating body. The learners have particularly welcomed the opportunity to test out their overarching capability



"A kind of reality check"

"Similar to in-company performance appraisals"

EXHIBIT

**BASFORD HALL COLLEGE
DEPARTMENT OF BUILDING SERVICES ENGINEERING
BESCO PROJECT MEETING – 13 NOVEMBER 1990
TASKS**

Select and agree a final agenda for the first formal meeting of company personnel. Using the agreed agenda, hold a formal meeting to resolve all items on the agenda. While the meeting is in progress, take minutes of the meeting and produce a finished copy of the minutes in a suitable format (preferably produced on a word processor), for consideration at the next project meeting on 20 November 1990.

**BASFORD HALL COLLEGE
DEPARTMENT OF BUILDING SERVICES ENGINEERING
BESCO PROJECT MEETING, 20 NOVEMBER 1990
TASKS**

Consider your existing roles as young trainee engineers within the building services industry. Discuss, assess and list what additional skill areas or attributes to the normal technical skills required, would be beneficial and useful to your future development to junior engineer status and beyond. After producing a list of items, briefly state why you think each one would be a useful additional skill to obtain.

**CHAMPION SPARK PLUG EUROPE
CHAMPION CONTINUING EDUCATION AND TRAINING SCHEME
OCCUPATIONAL CAPABILITY PROJECT
ASSIGNMENT
SPARKY PLC 1997 AND MARKETING
DRAFT PROPOSALS FOR STRATEGY**

BRIEF

Working in groups of four or five, you are to:

- 1 Assess the effects of marketing within the company, with particular reference to manufacturing.
- 2 Investigate current policy and future trends.
- 3 Draw up draft proposals and future trends.
- 4 It is suggested that groups decide on research methods and target sources. Specific tasks may then be allocated to sub-groups or individuals.

SOURCES

- 1 Interviews with CSP managers
 - 1.1 Manufacturing
 - 1.2 Marketing
- 2 CSP customers
- 3 WMC resources
- 4 WMC I/A package

development in circumstances which they believe are similar to those they will face in their future work roles as cell leaders.

The parameters of a simulated company of the mid nineties

Figure 12

- 1 The idea of defining a company of the future is particularly appealing to directors of businesses, and to those who are in the process of managing a major organisational transformation.
- 2 The specification process is improved if there are inputs from someone who has thought deeply about the future of the industry and/or occupation.
- 3 If programme designers do not have experience of using simulations as a means of developing competence and capabilities, they are likely to find it difficult to specify the features a simulation will need.

© The Prospect Centre

The future is going to be different from the past, and also from the present. If vocational education and training is to prepare people to play roles in an occupation, it must therefore be as much concerned with tomorrow's challenges as with today's.

Readers of this report have probably had the experience of facing a new and unfamiliar task or situation and wondering how to tackle it. If someone comes along and says "I've handled that task or situation before, and I know what to do, or how to approach it", we are greatly relieved.

Although many aspects of the future are unpredictable, there are certain trends, developments and implications which can be foreseen and anticipated. By having a simulated experience today of their likely consequences tomorrow, we are better prepared for the future.

Experiencing a simulation of the future has other potential benefits as well. It can enable people to turn abstract discussions into something which is real for them because they have experienced it. It can reinforce the importance of not sticking with old ways of thinking and working. It can enable people to make comparisons, and to work out in what direction things need to change. It helps to avoid the feeling that "if you don't know where you're going, any road will take you there".

The prospect of defining the parameters of a company of the future led to mixed reactions within the clusters. At Basford, the directors and senior managers in

Learning points

Why is a simulation of the future so important?

"We are better prepared for the future"

The clusters' experience



Students at Champion



Students at Solihull

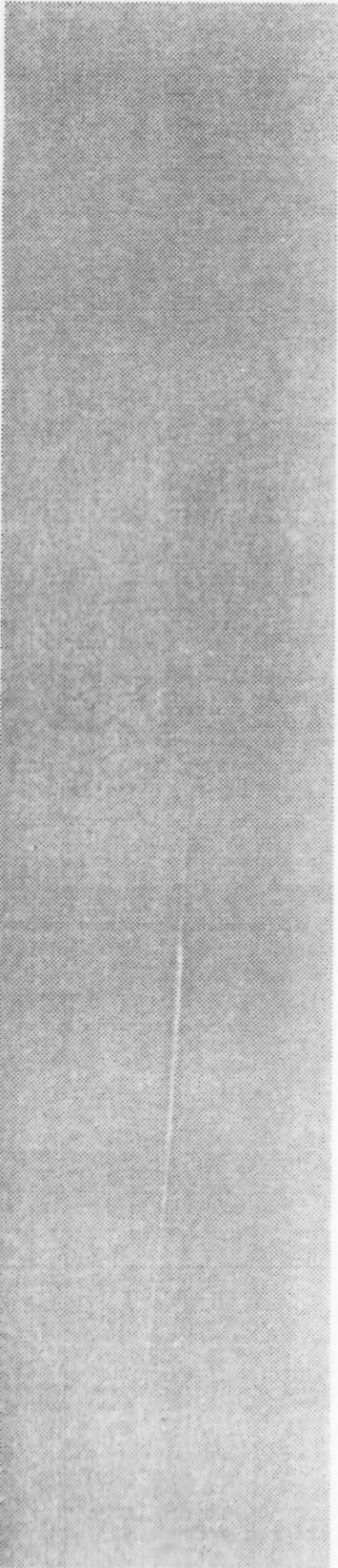
the project were excited and were eager to make a start. At Solihull, there was less enthusiasm. The college had experience of using simulations and of direct involvement in current company situations. The staff therefore welcomed a further opportunity to use real company situations of today as a vehicle for learning. Simulations seemed a regressive step and they needed convincing that a 'fictional' company of the future could add value. Moreover, cluster members were not experienced in trying to anticipate the future. In the Wirral, the managers at Champion knew they were facing a major change in their production processes so they had to face up to how things would be different in the future. On the other hand, college staff saw their function as providing technical education which would be needed regardless of a change in roles. A simulation of the future had very little to do with them.

At Basford, the cluster got off to a quick start in defining the parameters of the future company. Once started, they discovered that they had only a hazy notion of how the work of building services engineers would be likely to change as a result of the changes in the industry which they could foresee. The one thing they could see was that their industry would be making much more use of computer-aided design(CAD) and other computerised information systems integrated with CAD. This became the focus of BESCO.

The Solihull cluster finally decided that it would hand the prime responsibility to the learners for creating the parameters of TURBOMOW, the company of the future, on the grounds that the development of creativity would otherwise be constrained. While this has meant that their learners will have less experience of "working" in their occupation in the future, it has also meant that members of the cluster project team have been learning about the future through their students.

The managers in Champion were clear about technical and organisational changes, and they were also convinced that these would have implications for their people. However, they were less clear about just what these implications would be. They therefore agreed to a proposal from the consultants that they should carry out a systematic investigation. In addition to looking at companies which already use flexible manufacturing systems, the cluster obtained inputs from a professor of flexible manufacturing and other academic specialists in the field. Managers felt that this clarified the situation considerably.

But the cluster still faced both a political issue and a competence issue. If the project group specified SPARKY, the company of the future, it could be seen to be defining the future of their own company - this was the political issue. To handle this issue and also produce a useful specification would require someone who could take responsibility for doing so. In the end, the Wirral group handed the responsibility for specifying SPARKY to learners.



'We are questioning the company's open information system and we find that it does not give us the kind of technical and commercial information which is needed to run Sparky.'

Potential Cell Leaders Group, Champion Spark Plug Europe

'Most of our students have made suggestions about how things could be done differently. For example, one student thought the map drawer (in the industrial library) just didn't work well, so she sorted it out and now we have got a completely new system for it.'

Elaine Headford, Assistant Librarian, British Gas

Designing and realising learning situations which develop systems thinking and solving problems in systems terms

Figure 13

- 1 Faster progress in learning design is likely to be made in occupations where 'systems thinking' is already understood as a concept, and where project group members have had careers, or have current roles, which have already alerted them to the importance of this capability.
- 2 The 'systems thinking' of information technology specialists may not be particularly helpful because it may not extend to an understanding of business and management systems.
- 3 Project group members may need to learn about 'systems thinking' through exposure to particular examples of business systems and management systems.
- 4 College staff may need special help in understanding the importance of 'systems thinking', because their organisations are not managed as systems.

© The Prospect Centre

If people are going to play pro-active roles effectively at work, they need to be able to see how their own role fits into, and contributes to, their department and the business as a whole. They need to be able to anticipate the consequences of their actions in other parts of their organisation. They need to be able to take a helicopter view when they solve problems so that they do not create unnecessary problems for customers, or in other parts of the business, by what they do locally. They need to understand that there are inter-relationships and inter-dependencies when they act. People who do this are said to be 'thinking in systems terms'.

The need for such systems thinking is being made more acute by advances in the use of information technology. It is also being driven by moves to make customer satisfaction and quality into important business objectives. To satisfy a non-standard customer requirement and not disrupt the business, a person needs to work out what to do to make something non-standard happen in the business. When the business has also integrated its information systems, a person needs to understand whether these can cope with non-standard entries, and what the consequences may be at some point far removed from today's transaction: in the purchasing department, in the accounts department, even in another company or another part of the world.

Learning points

Why is systems thinking so important?

"Consequences of actions in other parts of their organisations"

"Thinking in systems terms"

"Even in another part of the world"

The clusters' experience

"Grasping the concept was the difficult part"

Learning points

Why is it important to use IT as a tool for managing situations?

Familiarity with the concept of systems thinking varied considerably between the clusters. It was almost a completely new idea to the Solihull group. In the Wirral, senior managers were familiar with it because they were introducing a system called MRPII for planning the flow of materials and inventories which was affecting virtually everybody in the business. At Basford, the project team members all knew what it meant in technical engineering terms, but even some of the company members had not applied it to their thinking about business, organisation or management.

Without an appreciation of the concept, it would be difficult to design and realise learning situations to develop it in others. Various approaches were tried. In Solihull, a senior manager who was in charge of change in the accounting systems of one of the companies was invited to contribute to the group. The concepts were too advanced. Information technology systems lecturers were seen to be the people who would know but they could not relate the concept to business. At Basford, the consultant wrote a paper but this also was too advanced. The breakthrough came when people began to make presentations about specific examples of business systems. The description by a manager of a new integrated system for supplies, installations and servicing at British Gas opened many eyes in the Solihull cluster.

Grasping the concept was the difficult part. Once this had been achieved, members of the cluster could see how to use it to design learning situations.

Using IT as a tool for managing situations

Figure 14

- 1 Make it necessary for learners to use IT as a tool virtually from the start.
- 2 Start with the use of software that is simple to manipulate.
- 3 After using IT as a tool for some time, learners are likely to want more skills and more technical knowledge; that is the time to provide it.

© The Prospect Centre

In most real work situations, people's jobs are not about designing new software or new computer systems. They want to get on with other tasks which are geared to other business requirements. IT is only a tool for them to achieve their objectives and purposes. If the purpose of vocational education and training is to prepare people to play their future occupational roles, it makes sense to give people the experience they will need in these roles.

Using IT as a tool to manage real situations is also important for other reasons. It is more motivating than sitting in a lecture, particularly if a person knows little about the subject. In addition, it gives expression to the concept of systems thinking, and practice in using such thinking 'for real'.

When the project started, there was only partial movement away from the treatment of IT as a subject at Solihull. However, the cluster quickly took the message about the importance of using it as a tool. By the time the programme started, learners were expected virtually from Day One to use IT as part of their work. Assignments at college and at work required the use of basic word processing, spreadsheets, databases etc. The use of IT became one of the criteria for assessment at each milestone of the learners' programme. In the early days, learners were keen to find out from self-taught managers how they had tackled various pieces of software. Later, they began to identify for themselves a need to learn more basic skills, eg typing, as a result of their experience. Learners have also started teaching their own managers at work and are suggesting new uses for IT within their companies.

At Basford too the message was quickly taken on board. The issue here was that the college had virtually no IT for learners to use. This was remedied but created another issue. Because of the complexity of the CAD software, no one – not even the lecturers – knew how to use it when it was first introduced. At a basic level, some learners and staff knew how to use a keyboard. They initially worked in pairs to transfer their knowledge and to figure out how to use the new IT. As in Solihull, the learners are taking their insights back to their employers.

In the Wirral, college staff were adamant that IT should be introduced as a subject, and that people had to learn the basics, such as typing, first. Company managers did not feel in a position to overrule them. Now that the learners are starting to use their IT for real assignments and tasks, they have become keen to find out more about its potential.

The clusters' experience

"The learners are taking their insights back to their employers"

Basing the curriculum on management systems rather than technical/academic subjects

Figure 15

- 1 The way a college is organised will have a big impact on the ease with which the curriculum can be re-organised; those which find it easiest are likely to see each programme as a 'project' for which a team is put together.
- 2 The college 'team' for Innovative Workforce projects should include all staff who will be expected to make a significant contribution to the delivery of the programme.
- 3 It is not difficult to re-organise existing syllabuses of award-making bodies into the new curriculum structure.
- 4 Company training managers may have the expertise to support college staff in re-organising the syllabus.

© The Prospect Centre

Learners often complain that the subjects they study are too divorced from the world which they know. They gain the impression that the purpose of vocational education is to acquire packages of knowledge and technical skill, and to learn how to apply them.

In a workplace where they are expected to be problem-solvers, to be pro-active and to manage situations, people's primary focus is on the requirements of their business. They want knowledge and skill not as self-contained packages to be applied but as a resource which they can draw on and use to analyse and solve real problems and to handle real situations. A subject-based curriculum does not make it easy for learners to learn to use their learning as a resource.

The operations of a business are organised and managed around a few key processes: selling, making and/or serving, buying, accounting, marketing, personnel management, planning. In most occupations, people can expect to play a part in all of these processes. Their roles are not based on the application of packages which treat these processes as subjects. For example, at Basford, the employers pointed out that even junior building services engineers should expect to have responsibilities in all of these processes as a natural part of their jobs. The employers were keen that the organisation of the curriculum should enable people to learn to handle these responsibilities within the framework of their occupational role.

If the purpose of vocational education and training is to enable people to play future occupational roles, one would expect to see this reflected in the basic organising principles of the curriculum.

Learning points

Why is it important

"Knowledge and skill not as self-contained packages to be supplied"

"Analyse and solve real problems and handle real situations"

EXHIBIT

**BASFORD HALL COLLEGE
CURRICULUM DEVELOPMENT - WORK PLAN**

DIVISION		COLLEGE UNIT NO	
TEAM	BSE TECHNICIAN	CERTIFIER	
UNIT TITLE	BESCO PROJECT PT 1	UNIT NO	
SUBJECT	TUTORIAL	LEVEL	NII
LECTURER	M WOOLEY	COURSE ABBR	T2
		DURATION (HRS)	60

NOTES: To be taken into account at all stages 1 - BESCO Aims & Action Plan. 2 - Learning Phases. 3 - Common Core Themes (i) Common Practices among Contractors, consultants, design - build - Network Organisations. 4 - European Dimension. 5 - IT for the late 1990s. 6 - Marketing for Survival. 7 - Development of Overarching Capabilities at all stages.

WEEK NO.	COMPETENCES/CONTENT/OBJECTIVES	COMMENT
1	Introduction to GIW	Learning phases
2	Form a management committee and allocate	Personnel function
3	Areas of responsibility	
4	Hold a formal meeting using correct procedures	
5	Discuss personnel functions and their inter-relations	
6	Discuss common themes and how they can be integrated into the project.	
7	Devise a business plan, taking into account future developments	
8	Plan market strategy	Marketing
9	Plan move to green fields site	
10	Agree a layout of a suitable building including futuristic IT systems	
11	Plan a work flow pattern	
12	List office equipment required, including IT	
13	Agree the office layout and construction	
14	Draw office layout using AUTOCAD	
15	Determine head losses and gains	
16	Determine head losses and gains	
17	Determine head losses and gains	
18	Estimate maximum heat gain in manager's office	
19	Select a suitable HHWS system	
20	Write a specification for the main equipment and fittings	Specification procurement
21	Prepare construction drawings using AUTOCAD where possible	
22	Lay out toilet accommodation	
23	Lay out practical work area	
24	Agree a form of contract for works	
25	Determine the stock to be held, if any	
26	Determine the stock of tools or hire	
27	Agree a programme for the work	
28	Prepare an interim submission for assessment	
29	Meeting to agree the assessments	

At the start of the project, two of the colleges organised their teaching around subjects and, in the third, movements away from this practice were confined to a few departments and teams. Because this aspect of the Innovative Workforce framework goes to the heart of 'the business of vocational education', it was not explicitly addressed as a principle at the beginning of the project by any of the three clusters.

Moreover, from the beginning, the consultants were aware that this project was just one initiative within each college. In each cluster, the project was directed at one particular qualification and student group and not at the college as a whole. This would mean that the project would have to work within the broader existing organisation of the college. Any changes which were brought about would be the result of flexibility in the organisation and good relationships. These changes might therefore be temporary, until the prevailing organisation re-asserted itself.

At Basford, the way in was through BESCO, the simulated company of the future, and through the BTEC requirement for an integrative assignment. It was first accepted that BESCO would be the basis for the integrative assignment in the programme. The consultant then suggested that the assignment should relate to how building services engineering businesses actually work. This led to a brainstorming session by the project team. The results were used to structure the sequence of the learners' activities within BESCO.

At Basford, the basic structure of the overall programme remains largely traditional, but the technical subjects have been 'tailored' to support BESCO. Learners still study technical subjects for most of their time at college. To meet the requirements of the new integrative assignment, students spend additional time at college, on a new "BESCO" course which runs throughout their programme. However, this course is organised around assignments which are concerned with real issues that building services engineers might encounter at work. Lecturers who are involved with BESCO have developed into 'learning managers' rather than instructors, as they help their students to learn to grapple with near-real life situations.

In the Solihull cluster, the issue of curriculum organisation was addressed after the concept of TURBOMOW, the simulated future company, had been conceived as the integrative assignment. Because the lecturers on the project team argued strongly that the learners should actually create the parameters of the simulated company, there was a visible need to create a structure within which the learners could work to do this. The goal for the end of the students' first year would be the creation of a business plan. One of the lecturers therefore proposed that the basic organising principle of the curriculum should be the issues which need to be addressed in creating a business plan. This proposal was accepted by the rest of the project team.

The clusters' experience

"The project would have to work within the broader existing organisation of the college"

"The lecturers have developed into 'learning managers' "

The entire curriculum in the Solihull project is therefore now organised around a series of milestones. Each milestone marks the end of a period of work on a particular aspect of business strategy. Implementing this idea has not proved difficult. Many of the key lecturers in the project were used to working flexibly in teams and were used to supporting project-based learning. Managers in the learners' companies have been more than willing to be used as sources of expertise for the learners to draw on. One of the lecturers was able to take the BTEC syllabus apart and recast it to support each of the milestones, without losing any of the content. As at Basford, the decision was taken to extend the time each week which learners spend on the programme. Now, in addition to one day per week at college, the learners are expected to use half a day in their companies to work on their assignments.

Perhaps the most important issue in implementation arose because not all the lecturers involved in the programme were members of the Innovative Workforce project team. This meant that they were not party to the thinking which led to the new curriculum design. As a result, they needed some persuasion from their colleagues and took some time to work out how they should be contributing to the new programme.

At Champion, there was a long period during which no overall curriculum design emerged. The company's managers wanted a concept that would not be based on subjects, and they said so. They also assumed that the college should take the lead in curriculum design. However, college lecturers continued to propose subject-based modules which were focussed on the acquisition of technical or basic skills. The situation was further complicated by the assertions of some company personnel that the programme design should not be pre-emptive. It was argued that the learning programme could only evolve after the parameters of Sparky had been determined by the learners. A breakthrough came after the decision to apply for a continuing education BTEC award for the programme. It was by then clearly understood that a programme which satisfied the company's forward needs could be structured around the key processes in managing flexible manufacturing systems. The preparation of the submission to BTEC would reflect this overall design and, at the same time, provide the milestones for the remainder of the programme. In this process, the training manager took the lead.

***"Organisation around
a series of milestones"***

***"Recasting the BTEC
syllabus to support
the milestones"***

EXHIBIT

**Assessment format
at Solihull**

STAGES IN ASSESSMENT

Preparation

- Objectives for milestone
- Grading criteria
- Overarching capabilities
- Assessment 'teams'
- Prompt questions

Assessment

- Self-appraisal by trainees
- Group work questionnaire
- College/company appraisal of work
- Teams discuss assignment with trainees
- Final grades and comments allocated/trainee debriefing

SOLIHULL COLLEGE OF TECHNOLOGY

**BTEC NATIONAL CERTIFICATE YEAR ONE
MILESTONE 6 – BUSINESS PLAN**

Distinction

Appropriate format for business plan used
Realistic, workable proposals put forward in plan
Thorough research undertaken
Presentation of written work to a high standard
No errors of syntax or spelling – suitable for immediate submission unaltered

Merit

Appropriate format for business plan used
Realistic decisions for business venture
Proposals clearly outlined
Research from various sources evident
Negligible errors of syntax, spelling and presentation; suitable for submission with little amendment

Pass

Business plan structured and coherent
Proposals satisfactory but insubstantial
Some evidence of research and planning
Written work generally literate with few errors, but needs some amendment for submission purposes

Referral

Inappropriate format for business plan used
Unrealistic proposals
Little evidence of practical research
Several errors in syntax, spelling and presentation

Developing and using a multiple assessment format

Figure 16

- 1 Project team members from companies have expertise to contribute from their experience of identifying training needs, performance appraisal and employee selection.
- 2 A learning programme with milestones can facilitate joint assessment by managers, lecturers and students.
- 3 Assessment of learners' achievements should be based on performance in the workplace as well as on performance in college assignments.
- 4 Joint assessment by project team members and learners facilitates the review of the learning programme as well as the students' work.
- 5 More effort is needed to articulate learning objectives and to articulate criteria for assessing the development of overarching capabilities.

© The Prospect Centre

In the Innovative Workforce context, 'multiple assessment' means two things. First, it means assessments of learners' achievements are made by all parties to the learning process – company managers, college lecturers and students. Secondly, it means that a number of methods, and different types of criteria, are used to make an assessment.

The first point is important because it reflects the way the world of work is moving. Everyone is seen as a customer, everyone expects to contribute a view, everyone is expected to be a partner in development. Increasingly, everyone is being asked to create their own personal development plans. The medium is part of the message.

The second point is important because pencil and paper exercises are inadequate for assessing a person's use of knowledge, understanding and skill in real situations. Equally, the assessment of performance in real situations is inadequate for assessing whether a person has acquired the range of technical knowledge and skill which the occupation calls for.

All three clusters introduced an assessment format which enabled all parties to contribute. In Solihull and in Champion, this was a natural way to work. At Basford, the consultant needed to be persistent. In all three clusters, the joint assessment process started out as an assessment of learners and rapidly expanded to become an assessment of the programme to date.

In Solihull, joint assessments are carried out at the end of each milestone in the programme. The development of overarching capabilities is assessed. Other

Learning points

What is 'multiple assessment' and why is it important?

"Assessments of learners' achievements are made by company managers, college lecturers and students"

"The medium is part of the message"

The clusters' experience

EXHIBIT
Assessment at
Solihull

SOLIHULL COLLEGE OF TECHNOLOGY

BTEC NATIONAL CERTIFICATE – YEAR ONE

ASSESSMENT OF _____ MILESTONE

Name

Date

TEAMWORK (if applicable) who did you work with?

INDIVIDUAL WORK – what have you done/achieved/learned from this milestone?
was your information effective?

HOW WELL DID YOU WORK INDIVIDUALLY?

WHAT SOURCES OF INFORMATION WERE USED FOR THE COMPLETION OF THIS MILESTONE?

PRESENTATION – how well do you think the presentation with the employers went?

HOW WELL DO YOU THINK THE MILESTONE WAS ORGANISED? ie, were there any communication barriers?

DO YOU THINK YOU COULD HAVE IMPROVED YOUR MILESTONE IN ANY WAY? IF SO, HOW?

BTEC NATIONAL CERTIFICATE – YEAR ONE

NAME:

MILESTONE:

NO:

DATE:

SUMMARY OF WORK AND ACHIEVEMENTS SINCE LAST REVIEW:

OVERARCHING CAPABILITIES:

SELF-ASSESSMENT:

PEER GROUP ASSESSMENT:

TUTOR ASSESSMENT:

EMPLOYER ASSESSMENT:

OBJECTIVES FOR NEXT MILESTONE:

QUERIES FOR ASSESSMENT

18 OCTOBER 1990

- 1 What have you done with the text?
- 2 How did you go about doing it?
- 3 What do you think you have achieved?
- 4 What were the problems you met?
- 5 What have you learned from the process?
- 6 What would you do differently next time?

objectives, which change with the milestone, are also assessed. The training managers from the participating companies have designed some of the processes and have contributed criteria for assessment. Assessments have been based on college work, not on performance at the workplace. Assessment follows presentations by groups of learners, and of individuals, of the work they have done towards the achievement of the current milestone, and discussion with the project team about how they went about their assignment. The results of the assessments are now being used to plan the detail of the college work in the coming milestone. The cluster is now also working towards the collection of evidence from learners' supervisors at work, to feed into the assessment process. This has flagged up a need to be clearer about three aspects of learning: those matters which are best learned in the college context, e.g. technical knowledge, skills and project assignments; assignments which should be based in the company and which develop overarching capabilities; and on-the-job learning.

In the Wirral, all parties come together once a month for review meetings, where the subject of the review is the programme. There is also some discussion of the learners' perceptions of what has and has not been effective in terms of contributions to their learning. One of the learners chairs these meetings. Formal assessment of learners has taken place at other times, at the end of formal presentations. These have been based on the company's performance appraisal process. During their presentations and in their assessment, the learners have shown that they can see themselves developing, drawing on and deploying the overarching capabilities they will need as cell leaders.

At Basford, college staff planned the projects in the integrative assignment so as to develop overarching capabilities. However, they have found it very difficult to assess whether they are being developed. They started by trying to "grade" the results of learners' project work against the overarching capabilities, but did not find this useful for any purpose. They then realised that they would need some other way of doing it. The project consultant suggested and demonstrated one solution on several occasions. This would involve asking the question: "How would we expect the overarching capabilities to show themselves in the ways in which learners go about tackling a particular assignment?" Lecturers have not found this acceptable because it is not "scientific" and not "measurable". For the same reason, the lecturers have been reluctant to pursue the development of a format for assessing learners' performance at work.

Formal employee assessment processes are less developed in the companies in this cluster so the employers have not been able to give a lead, as they have done in Solihull and the Wirral.

"The need to be clearer about three aspects of learning"

"One of the learners chairs the assessment meetings"

EXHIBIT

Assessment at Solihull

SOLIHULL COLLEGE OF TECHNOLOGY

BTEC NATIONAL CERTIFICATE – YEAR ONE

ASSESSMENT

Name

Date

TEAMWORK – who have you worked with?

What have you contributed? List and ask another member of the group to sign to confirm this

Comment on the way in which you felt the group worked together – as a team, how it dealt with others' feelings and your own! Did you share the tasks equally? If not, why not? Did everyone have the chance to participate? How?

Individual work – what have you done?

When?

How effective was it?

THE PRESENTATION – how effective was it? How did it compare to the other presentations? How do you feel about your own contributions? What went well? What did not go according to plan? How far did you plan? Will you plan next time?

COMMUNICATION How well did your group communicate? Did you present the information clearly to others? Did you learn from others? How well do you feel that your part of the presentation went and why? What went well and what will you change next time? Comment on any problems you overcame, or didn't!

What skills have you used for this milestone, such as information gathering, information processing, working with others, numeracy, design and visual discrimination, learning and studying, communicating, identifying and tackling problems. Comment on those you have used

How will these comments affect the way you will work for the next milestone and why?

SOLIHULL COLLEGE OF TECHNOLOGY

BTEC NATIONAL CERTIFICATE – YEAR ONE

ASSESSMENT OF _____ MILESTONE

Name

Date

TEAMWORK (if applicable) who did you work with?

INDIVIDUAL WORK – what have you done/achieved/learned from this milestone? Was your information effective?

HOW WELL DID YOU WORK INDIVIDUALLY?

WHAT SOURCES OF INFORMATION WERE USED FOR THE COMPLETION OF THIS MILESTONE?

PRESENTATION – how well do you think the presentation with the employers went?

HOW WELL DO YOU THINK THE MILESTONE WAS ORGANISED? ie, were there any communications barriers?

DO YOU THINK YOU COULD HAVE IMPROVED YOUR MILESTONE IN ANY WAY? IF SO, HOW?

It is clear that the clusters need more tools if they are to make the most of the multiple assessments which they are now pursuing. One useful set of tools may be the elements and units of competence embodied in NVQs. These would provide an additional set of learning objectives which can be used for talking about learners' performance, particularly in the workplace. But these will not help people to assess whether learners are developing or using overarching capabilities. To do this, assessors will need something different. One tool they may need is new ways of thinking about standards for overarching capabilities as they relate to an occupation. Assessors – learners, their managers and college staff – may need standards which will enable them to answer such questions as: "Is a person demonstrating the overarching capabilities called for **in the occupation** by the ways in which s/he has handled a range of situations?"

"Over time, is this person achieving higher standards in relation to the overarching capabilities for the **occupation**?"

To develop such standards, work would be needed to give examples of the minimum which is likely to be widely acceptable by employers of people in the occupation, and to describe 'benchmarks' which would show a progression of capability.

Phasing the development of the 'innovative workforce' programme

Figure 17

- 1 There is a limit to the speed with which 'Innovative Workforce' vocational education and training programmes can be developed; the fundamental limit is governed by the amount of learning which college and company partners will need for themselves.
- 2 Recognising the learning which is likely to be needed, it would be realistic to envisage a five-phase initiative which has staged objectives and builds the understanding and skill of cluster project team members along the way.

Learning points

Phase 1 Objectives:

- Establishment of a college-company cluster project team
- Agreement on the occupation(s) to be the focus, on broad objectives and working arrangements
- Familiarity with the Innovative Workforce concept
- Creation of multiple assessment formats

Phase 2 Objectives:

- Design of, and plans for implementing, a simulation of a company of the future as the programme's integrative assignment
- Creation of opportunities for learners to use IT as a tool

Phase 3 Objectives:

- Implementation of Phase 2 objectives
- Development of a framework of overarching capabilities for the occupation
- Identification of learning situations which can develop systems thinking, and problem-solving in systems terms
- Design of college assignments, in-company projects and work experience to integrate the development of these capabilities, and other relevant knowledge, skill and competence

Phase 4 Objectives:

- Review of implementation of Phase 2 objectives
- Implementation of Phase 3 objectives
- Re-design of curriculum around management systems
- Review of implementation of Phase 3 objectives

Phase 5 Objectives:

- Implementation of Phase 4 objectives
- Overall review of Innovative Workforce programme.

The experience of the clusters, described earlier in this chapter, makes clear the importance of planning from the start. The experience of the clusters also shows that some parts of the Innovative Workforce concept are easier to grasp than others. This is connected both with people's experience and priorities, and with their understanding and skill. It suggests that a planned approach should take into account where progress can be made most quickly. It should also seek a sequence of achievements which can progressively build the competence and confidence to tackle the more unfamiliar aspects of the changes which will be needed.

Every cluster will have a different starting point and a different development curve. However the experience of the three clusters in this project suggests that there may be some common patterns.

First, and most obviously, time will be needed to create a cluster, to settle its membership, to decide on the occupation and programme(s) which it will address, and to decide on broad plans and working arrangements. It will be important early on for all cluster project team members to become familiar with the 'Growing an Innovative Workforce' concept – perhaps by reading this report and/or by visiting the first project sites and by discussion and review.

For the first stage of 'real' work, cluster members are likely to find it useful to tackle something tangible. In the Innovative Workforce project, the involvement of students in the assessment process, as well as that of employers and lecturers, was a powerful motivator for further development. Two of the three clusters found little difficulty in creating such a multiple assessment format. This could be one of the first tangible tasks.

The idea of a simulation of a company of the future received an enthusiastic response from employers. Some lecturers had also had experience of using simulations. This suggests that the simulation could be a second 'tangible' task to go for. Our experience shows that cluster members will need to make a choice. They will have to decide either to create the parameters of the simulation themselves, or to ask learners to do this for themselves by creating a business plan. If they choose the latter route, cluster members will need to decide what business the simulated company is in. They will also need to identify the issues which learners will need to address in order to create a business plan.

Either choice by the cluster is likely to lead to considerable learning by cluster members about the ways in which organisations are changing, their causes and the implications for the occupation in question. The implementation of the future simulation will also call for an identification of lecturers' learning needs as 'learning managers'.

Why might phasing be needed?

"A planned approach should take into account where progress can be made most quickly"

Possible work at different stages

"Creating a multiple assessment format could be one of the first tangible tasks"

"Simulation could be a second 'tangible' task"

***"Calling Into
question the overall
structure of the
existing curriculum"***

A task which our clusters were able to address without much difficulty was the introduction to their programmes of IT as a tool. This is a practical example of 'systems thinking' and could also be an early part of programme development work.

While these developments are being implemented, the time is likely to be right to address the question of overarching capabilities for the occupation. The ground will have been prepared by the thinking which has gone into preparing the simulation, and by the initial experience of the multiple assessment format.

Since systems thinking and solving problems in systems terms are likely to feature as overarching capabilities, this is also the time to bring these onto the table.

Experience suggests that a systematic investigation of the overarching capabilities which will be essential is likely to be a more rewarding approach than brainstorming. Such an investigation could also propose standards for the overarching capabilities, which could be imported into the multiple assessment format.

The investigation can also be used to identify work situations in the participating companies which could be used to develop overarching capabilities, or to assess them. These findings could feed into the more general task of reviewing college assignments and work placements, and re-shaping them with overarching capability objectives in mind.

It may be that the work up to now has already called into question the overall structure of the existing curriculum. If not, or if the organisational structure of the college has made significant change difficult, this may be the time to undertake a thorough review in the light of learning and progress so far. Implementation may take the cluster team beyond its members and into discussions with senior college management.

Under normal circumstances, we would expect to review the basic assumptions and premises of such an initiative after it had been running for some time. For example, we would want to review how the views of the future by employers, and those who know an occupation, are changing. We would want to find out in what ways employers and learners were satisfied and dissatisfied with their vocational education experience and learning some time after learners had received their qualification. Our experience with the Innovative Workforce project has not yet been long enough to enable this to happen. However, this is a natural task to build in at the end of a cycle of programme development.

**STUDENT ATTITUDE SURVEY
DAY RELEASE STUDENTS
GIW PROJECT**

As your current course and experience in this company are part of a national project aimed at improving vocational education for young people in the UK, we are interested in gaining your perceptions, as a student, on your course. This will help to improve future courses in other colleges in the UK.

The questionnaire is not intended as a test of your knowledge. Your responses can be anonymous if you wish and if you do not know the answer to a question or it is unclear, please say so. We would be grateful if you would complete the questionnaire, which should take about half an hour of your time.

MANY THANKS FOR YOUR ASSISTANCE

xxx = Occupation i.e. Building Services or Finance and Business Administration or Flexible Manufacturing.

1 What are you learning at college and at work? (please tick)

- technical knowledge
- technical skills
- overarching capabilities
- how 'xxx' is likely to change in the future
- how to draw on what you are learning to handle new situations at work

2 Who gets involved in planning your course and your lessons? (please tick)

- teachers
- other college staff
- company staff
- students
- don't know
- anyone else

3 Who is involved in helping you to learn about 'xxx' and how to become effective in that occupation? (please tick)

- teachers
- other college staff
- training staff in company
- managers in departments in the company
- fellow students
- anyone else

4 Who is involved in assessing your progress at college? (please tick)

- teachers
- other college staff
- training staff in company
- managers in departments in the company
- fellow students
- anyone else

5 Who is involved in assessing your progress at work? (please tick)

- teachers
- other college staff
- training staff in company
- managers in departments in the company
- fellow students
- anyone else

EXHIBIT

EXHIBIT

6 What is your/an integrative assignment?

7 What is its purpose?

8 Why is it based on a company of the future?

9 To what extent is all your learning at college future-oriented?

(please underline your response)

none/little/much/most/all

10 How important do you think it is for your learning to be based on a company of the future and what might be required in the future?

(please underline your response)

vital/quite important/not important at all

11 To what extent is your learning at work based on what might be required in the future?

(please underline your response)

none/little/much/most/all

12 To what extent is your learning at both college and work helping you develop the technical knowledge and understanding required in 'xxx'?

(please underline your response)

a great deal/some/a little/not at all

13 To what extent is your learning in college and at work helping to develop the technical skills required in 'xxx'?

(please rank in order under each column; 1=most; 4=least)

	knowledge	skills	understanding
sessions in college	2	2	1
experience in company	1	1	1
integrative assignment	3	3	1
anything else	4	4	1

14 What do you believe has contributed most to the development of your technical knowledge, skills and understanding?

(please rank in order under each column; 1=most; 4=least)

	knowledge	skills	understanding
sessions in college	1	1	1
experience in company	1	1	1
integrative assignment	2	2	1
anything else	2	2	1

15 To what extent is your learning helping you develop personal skills, eg problem solving, creativity and initiative as well as knowledge, skills and understanding of 'xx'?

(please underline your response)

a great deal/some/a little/not at all

**STUDENT ATTITUDE SURVEY
DAY RELEASE STUDENTS
GIW PROJECT**

As your current course and experience in this company are part of a national project aimed at improving vocational education for young people in the UK, we are interested in gaining your perceptions, as a student, on your course. This will help to improve future courses in other colleges in the UK.

The questionnaire is not intended as a test of your knowledge. Your responses can be anonymous if you wish and if you do not know the answer to a question or it is unclear, please say so. We would be grateful if you would complete the questionnaire, which should take about half an hour of your time.

MANY THANKS FOR YOUR ASSISTANCE

xxx = Occupation i.e. Building Services or Finance and Business Administration or Flexible Manufacturing.

1 What are you learning at college and at work? (please tick)

- technical knowledge
- technical skills
- overarching capabilities
- how 'xxx' is likely to change in the future
- how to draw on what you are learning to handle new situations at work

2 Who gets involved in planning your course and your lessons? (please tick)

- teachers
- other college staff
- company staff
- students
- don't know
- anyone else

3 Who is involved in helping you to learn about 'xxx' and how to become effective in that occupation? (please tick)

- teachers
- other college staff
- training staff in company
- managers in departments in the company
- fellow students
- anyone else

4 Who is involved in assessing your progress at college? (please tick)

- teachers
- other college staff
- training staff in company
- managers in departments in the company
- fellow students
- anyone else

5 Who is involved in assessing your progress at work? (please tick)

- teachers
- other college staff
- training staff in company
- managers in departments in the company
- fellow students
- anyone else

EXHIBIT

EXHIBIT

6 What is your/an integrative assignment?

7 What is its purpose?

8 Why is it based on a company of the future?

9 To what extent is all your learning at college future-oriented?

(please underline your response)

none/little/much/most/all

10 How important do you think it is for your learning to be based on a company of the future and what might be required in the future?

(please underline your response)

vital/quite important/not important at all

11 To what extent is your learning at work based on what might be required in the future?

(please underline your response)

none/little/much/most/all

12 To what extent is your learning at both college and work helping you develop the technical knowledge and understanding required in 'xxx'?

(please underline your response)

a great deal/some/a little/not at all

13 To what extent is your learning in college and at work helping to develop the technical skills required in 'xxx'?

(please rank in order under each column; 1=most; 4=least)

	knowledge	skills	understanding
sessions in college	2	2	1
experience in company	1	1	1
integrative assignment	3	3	1
anything else	4	4	1

14 What do you believe has contributed most to the development of your technical knowledge, skills and understanding?

(please rank in order under each column; 1=most; 4=least)

	knowledge	skills	understanding
sessions in college	1	1	1
experience in company	1	1	1
integrative assignment	2	2	1
anything else	2	2	1

15 To what extent is your learning helping you develop personal skills, eg problem solving, creativity and initiative as well as knowledge, skills and understanding of 'xx'?

(please underline your response)

a great deal/some/a little/not at all

16 In which of the following areas do you think you will/have improved as a result of your day release course and experience in the company over the past few months?
for example:

problem-solving
communication
business thinking
initiative
flexibility
any others?

decision-making
working with others
systems thinking
personal responsibility
creativity

17 How important do you think it is to your future success in 'xxx' to develop these personal skills?

(please underline your response)

vital/quite important/not important at all

18 What do you believe has contributed most to the development of these skills?

(please rank in order; 1=contributed most; 3=least)

1 sessions in college
1 experience in company
2 integrative assignment
2 anything else

19 What have you learnt about integrated systems? *(please tick)*

Nothing
What they are
What sort of systems are encountered in 'xxx'
About the organisation as a system
The interaction of building services engineering with systems in the business
Anything else

20 How have you learnt most about integrated systems? *(please tick)*

Through your integrative assignment
In using software/simulations
Through experience in company
At college
Anything else

21 How important do you think integrated systems will be in the future in 'xxx'?

(please underline your response)

vital/quite important/not important at all

22 Have you been involved in designing or amending integrated systems?

(underline as appropriate)

Yes/No/Don't know

23 Do you feel you are learning all that is necessary in becoming effective in 'xxx' in your company?
(delete as appropriate)

Yes/No
If not, what is missing?

EXHIBIT

24 How much of what you are learning do you believe will be useful in 'xxx' in any company?
(please underline your response)

all/most/some/little/none

25 Do you feel what you are learning both encourages and enables you to suggest improvements at work?

(please underline your response)

definitely /a little/not at all

26 Faced with new situations at work, do you feel you are able to draw on elements of what you are learning or have experienced previously to tackle each new situation?

(please underline your response)

mostly/usually/rarely/learning or experience not always applicable

27 Who is responsible for your progress on this course?

(please tick)

college tutors
yourself
supervisors at work
fellow students
anyone else? If so, who?

28 To what extent do you feel your course and experiences in company and at college are encouraging you to become independent in 'xxx'?

(please underline your response)

very definitely/a little/not at all

29 How is this being encouraged, if at all? (please tick)

By managing own projects
By negotiating projects or changes
By designing and improving systems
By communicating ideas/suggestions at college and at work
Through teamwork where everyone has their own role to play in the team
Anything else

30 How similar are the teaching styles at college to those you were used to at school?

(please underline your response)

very different/a few similarities/very similar/ no differences

31 How does your college tutor's role differ to that of your school teacher?

(please tick)

Less teaching, more helping us to learn
Helping us to work as a group
Helping us to learn through different media, for example, computers, other departments at work, each other, external surveys, the library
More like a member of the team
Learning with us, rather than teaching us
Showing us how to learn for ourselves
Feeding in ideas which we can take or leave
Seeking our ideas and input more
Anything else

32 Do you notice any differences between your course and other day release courses in college or at other colleges?

(please underline your response)

many/some/few/none/don't know

33 What sort of differences, if any, do you perceive?

34 What is the best part of your course?

35 And why?

36 Are you aware of the national importance of your course?

yes/no/not sure

37 Why does your course have national significance?

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE

EXHIBIT

Chapter IV

HOW LEADERS CAN IMPLEMENT THE "INNOVATIVE WORKFORCE" FRAMEWORK

The Background

For the first time in British history, education, including vocational education and training (VET), has become one of the top political issues for all parties. In industry too, there is now, once again, a substantial head of steam for more and better training and after a period of low esteem, education is accepted as being important to industrial success. For the first time in its history, further education (FE) is being given high status with other main line education providers.

Therefore, the "innovative workforce" framework should find fertile ground in which to spread. Its main contribution lies in its potential to bring Britain back into the first league of international VET. Therein lies also its main obstacle. "Growing an Innovative Workforce" is an innovative framework and, in the first instance, will have to be aimed at forward-looking companies/public services engaging in joint ventures with forward-looking colleges.

This chapter proposes steps which interested parties can take to make the framework widely known to, and adopted by, such companies, public services and colleges.

Favourable factors in the environment

International trends and developments in the private and public sectors are combining with expectations in the UK to favour the development of people at all levels who are well educated and who are able to make creative contributions:

- In the 90s, companies will increasingly depend on their whole workforce to achieve not only total quality and customer satisfaction but to innovate in products and marketing, and to reach new dimensions of flexibility.
- More employees will be working in foreign owned companies with higher standards of VET.
- Public services will have to earn the trust of voters and clients.
- The agenda for VET will largely be set in Europe; British qualifications will be matched against the benchmarks of those in Germany, France and other highly industrialised countries, as will be the percentage of vocationally qualified people in the workforce.
- Political pressure, including the Further and Higher Education Act, will demand new management competence and approaches in FE.

Developments in forward looking companies and colleges

VET in forward looking companies is becoming a business concern for senior management. Where this happens VET is more likely to be linked with business strategy and business planning.

Innovative developments in education are bringing about radical changes in the roles of teachers and students. These developments run in parallel with changes in management styles and cultures in companies. In some colleges there are now departments or units where participative learning has become a reality. Teachers are managers of learning aims and processes, available to help and guide students. Students are expected to learn rather than be taught. Boundaries between academic subjects are crossed and both teachers and students work in teams.

Over the years, the fruits of research and development sponsored by the Further Education Unit have also been instrumental in promoting new ideas in further education.

Opinion-forming organisations

Employers are now collectively more involved in VET than in the past. The Confederation of British Industry, the Chambers of Commerce and the Institute of Directors (IoD) are exhorting employers to increase and improve training in their companies. The situation of these British organisations is different from their statutory continental sister organisations which frequently have specific training responsibilities and powers.

Two other employer-led organisations, the TECs (Training and Enterprise Councils) and "Industry Lead Bodies" have the potential to support in their different ways the spread of world-class, innovative VET initiatives.

The growing number of validating bodies such as BTEC, City & Guilds and the RSA, with the National Council for Vocational Qualifications (NCVQ) at the apex, have the power of WYTIWYG (what you test is what you get).

Various industry/education partnerships can bring new developments to the attention of their members, supply them with information and help them to evaluate these developments against their own needs.

The Staff College for Further Education has the opportunity to influence managers in colleges to adopt forward-looking management styles, use European benchmarks for curriculum development and modern approaches to the management of learning.

Large employers

One of the projects promoted by the Further Education Unit has been concerned with the education and training implications of "Key Technologies", an area adjacent to the concerns of the Innovative Workforce project.

Finally, the Industry Training Organisations (ITOs) develop training policies for their sectors and advise member companies on training matters.

Infrastructure

Two supporting pillars could aid the adoption of a framework like "Growing an Innovative Workforce". One would be a national place of expertise which serves as a point of reference to companies, services and colleges. Information, advice and further development would be focussed there.

The second pillar, which could preferably be the same institution, would develop the capability of training both college and company staffs before and/or during implementation in their respective organisations. This institution would absorb, evaluate and pass on the experience of previous joint college/companies ventures.

How organisations and individuals can contribute

Some large employers will be strongly pre-disposed to explore the "Innovative Workforce" approach. These are companies and public service organisations in which top management has concluded that an innovative workforce – the whole workforce – has become a strategic necessity. In such organisations, we often find all manner of education and training activities designed to raise the motivation to learn, offer opportunities for learning and improve various competences of employees.

"Growing an Innovative Workforce" can be an instrument for focusing education and training activities on the future of the business. This can be done by bringing together senior general managers, the head of corporate planning, the head of information systems and the head of personnel/training management. The question for discussion would be: "What capabilities will we have to have available, and what roles will the workforce have to play in our organisation to make possible the achievement of our long-term intentions?"

To make such a meeting productive, sufficient groundwork will have had to be done by personnel/training to offer options for discussion and choice. The Innovative Workforce report could be used for developing the meeting's agenda.

A second use of the Innovative Workforce report by large, forward-looking companies and public services could help in their relationships with universities, polytechnics, colleges and schools. Large companies usually have well-established criteria for suppliers of goods (like components and materials) and services (like contractors). They may not have developed similar explicit

criteria for educational institutions as preferred sources of people. The learning aims and learning processes of Growing an Innovative Workforce can be used as benchmarks for choosing educational institutions with the greatest affinity with the aims of the company.

Where a company or public service already has criteria, it may welcome the opportunity of running an independently produced rule against its existing practices.

Finally, there are many examples to show that the trend in which companies develop joint strategies with their suppliers of goods and services can serve as a model for relationships with educational institutions. The closest such relationship is the joint company/college development and implementation of an education and training programme.

Programmes of this kind are still rare and, where they exist, are usually confined to managerial and professional schemes. The report offers a practical guide towards a closer sharing of values, strategies and effective working between employer, educational provider and individual learner.

Employers in the private and public sectors, as well as individual managers, often belong to national organisations, many of which have local branches. Some of the most relevant are the CBI, the Chambers of Commerce, the Institute of Directors, the British Institute of Management, the Institute of Personnel Management, the Institute of Training and Development and many other professional bodies. Corporate members or individuals could stimulate one or more of these organisations to organise an evaluation of the Innovative Workforce report. This might start with a meeting and be taken further by setting up a group of interested people. This special interest group could invite one or more local colleges to join with it to explore the need for the Innovative Workforce approach for one or more local key occupations. The group could then decide whether to act.

The initiative for evaluating the Innovative Workforce framework could also come from Training and Enterprise Councils or Industry Training Organisations. For instance, Industry Training Organisations could examine the framework with regard to occupations which are critical to their industry's successful future development.

Similarly, TECs could evaluate the framework against the key economic developments they wish to foster in their areas. Industry Training Organisations and TECs could run workshops for groups of members from forward-looking companies who would report to their respective committees or councils.

Trade unions could also evaluate the Innovative Workforce framework for the benefits which it could bring to their members. Reaching a more "professional"

Action with other employers

Action by trade unions

Colleges of further education

level of achievement would strengthen the contributions which their members can make to the success of their employing organisation and would also be an important individual asset at times when labour markets are turbulent and hostile.

Where unions are a part of forums in companies or public service organisations where training is discussed, they could suggest an evaluation of the Innovative Workforce framework.

At national level, a number of unions maintain their own training organisation. The Innovative Workforce concepts could be examined for the added value which they might bring to unions' training programmes.

The three projects which form the substance of this report had their focus in three selected colleges. The colleges were able to bring together employers which wanted to advance the education and training of potential or existing employees in a particular occupation. It was this strength of colleges which made it possible to include, very successfully, a group of small and some medium-sized enterprises (SMEs) in a leading edge education and training development.

Therefore, colleges have the potential to give SMEs access to the Innovative Workforce framework. College principals could initiate education/industry partnership meetings with SMEs. The participants could read the Innovative Workforce report and evaluate it in the light of their anticipated developments. This evaluation could be given depth by making it a joint venture between the college and those companies concerned with a particular occupation. Both college and SMEs would benefit from this process which, incidentally, might attract the support of the local TEC. The companies would gain an independent outsider's views and the college would gain some real understanding of how the companies work and what contributions will be expected at work from college "graduates".

Within the college itself, the principal and senior management could evaluate whether the Innovative Workforce approach could serve as a basis for a pilot project in which one part of the college takes the lead.

The Staff College plays a number of roles in the development of further education but its prime responsibility is the improvement of the management of further education. In advancing this aim the Staff College could set up joint reviews with colleges to evaluate the Innovative Workforce framework as a means of accelerating the growth of their capability to make the most of their future status as incorporated bodies.

Finally, "Education/Business Partnerships" and the many less formal education/industry partnerships could examine the support they should give to the joint

The staff college for further education

development and implementation of education and training programmes which respond to the future challenges to British business and British education and training.

Summing up

A widespread adoption of the Innovative Workforce framework could be a powerful lever for enhancing Britain's competitive position in international markets. It would also bring British vocational education and training into the front rank of European performance. Even with the best of intentions there would be a long way to go. What can we, realistically, hope to achieve?

The suggestions made in this chapter could spread an awareness and understanding of the framework and increase the motivation to adopt it. Those who go forward to implementation would become part of a chain of "islands of capability". There would be an increasing number of employers and colleges up to speed against European benchmarks.

Once there are enough islands, it will be natural for them to link up and break "the cycle of low expectations". The people in all the various organisations who have played an active role in these developments would form an ever larger pool of experience and vision.

Partnership between education and business

ANNEX 1: MEMBERS OF THE STEERING COMMITTEE

- Chairman:** Geoff Melling
Director
Further Education Staff College
- Members:**
- Industry:** Mike Bruce
Organisation and Development Manager
British Airways
Tony Chaplin
Head of Group Training & Development
Pilkington plc
David Thompson
Managing Director
Portscene Ltd
- Education:** Clive Brain
Principal
Swindon College
Albert Clyde
Development Officer
FEU
Margaret Levy
Director
FESC
Work Based Learning Project
Beryl Pratley HMI
- Employment Department** Alan Bateman
Project Manager
Strategy and Further Education Branch
John Temple
Head of Education and Skills
Analysis Branch
Nicola Dodu
Project Manager (until April 1991)
Research and Evaluation Branch
Caroline Bicknell (from April 1991)
Education and Skills
Analysis Branch

THE PROSPECT CENTRE

- Project Director Chris Hayes
- Secretary to the
Steering Committee Ann Richards

**ANNEX 2: MEMBERS OF THE PROSPECT CENTRE
PROJECT TEAM**

Chris Hayes	Project Director
Alan Anderson	Project Leader, Nottingham
Nickie Fonda	Project Advisor
Margaret Raff	Project Leader, Solihull & Wirral
Ann Richards	Project Team Member Secretary to the Steering Committee

**The Prospect Centre
Gough House
57 Eden Street
Kingston-Upon-Thames
KT1 1BW**



Telephone: 081 541-4773